

THE
ANATOMY OF THE REGIONS

INTERESTED IN THE
SURGICAL OPERATIONS PERFORMED UPON THE HUMAN BODY,

WITH
OCCASIONAL VIEWS OF THE PATHOLOGICAL CONDITIONS
WHICH RENDER
THE INTERFERENCE OF THE SURGEON NECESSARY.

IN A SERIES OF PLATES,

THE SIZE OF LIFE.

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WITH ADDITIONS.

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THE HISTORY OF THE

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BY THE REV. J. H. WELLCOME

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PLATE I.

HYO-CARDIAC REGION, OR REGION OF THE OS HYOIDES AND CARDIA.

- A. The mouth.
- B. The chin.
- C, C. The auricles, or external ears.
- D, D. The shoulders.
- E, E. The clavicles.
- F. The front of the chest.
- G. The lower half of the sternum.
- a, a. The skin of the neck turned aside.
- b, b. The platysma myoides muscle also turned aside.
- c, c. The substernal, or interclavicular ligament.
- e, e, e. Longitudinal section of the sternum.
- f, f. Longitudinal division of the cartilage of the third rib.
- g, g. Posterior or inner aspect of the sternum, turned outwards.
- h, h, h, h, h. The double transverse cut surfaces of the two first costal cartilages and of the half of the third.
- i, i. Cartilaginous line marking the division between the first and second pieces of the sternum. This is not found after puberty.

Muscles.

- 1. Raphe or line of union of the muscular fibres of the mylo-hyoidus of the right and left sides of the body.
- 2, 2. Anterior belly of the digastricus or biventer maxillæ muscle.
- 3, 3. Hyoglossus.
- 4, 4. Stylo-hyoideus.
- 5, 5. The aponeurosis which connects the middle tendon of the digastricus (and in

which it plays obscurely) to the os hyoides.

- 6, 6. A small portion of the constrictor inferior pharyngis muscle.
- 7, 7, 7, 7. Sterno-hyoidei muscles.
- 7', 7'. Omo-hyoidei.
- 8, 8. Sterno-thyroidei, both pulled aside by a dissecting hook.
- 10, 10. Thyro-hyoidei.
- 10', 10'. Crico-thyroidei.
- 11. Sterno-mastoidei.
- 12, 12. First internal intercostal muscle.
- 13, 13. Second internal intercostal.
- 14, 14, 14. Superior fasciculi of the triangularis sterni.

Veins.

- 15. Vena cava superior.
- 16, 16. Right and left subclavian veins.
- 17, 17. Internal jugular veins.
- 18, 18. Internal mammary veins.
- 19, 19. Anterior mediastinal veins divided.
- 20, 20. Inferior thyroid veins.
- 21, 21. Lateral thyroid veins.

Arteries.

- 22. Aorta.
- 23. Arteria innominata, or brachio-cephalic artery of the right side.
- 24, 24, 24. Right and left subclavian arteries.
- α, α. Internal mammary arteries.
- ε, ε. Right inferior thyroid.
- γ, γ. Right vertebral artery.
- δ, δ. Left inferior thyroid artery.
- ε. Left vertebral artery.

- 25, 25. Common carotid arteries of the right and left sides.

- 26, 26. External carotid artery.

- 27, 27. Internal carotid.

- 28, 28. Superior thyroid.

Nerves.

- 30, 30. Hypoglossal or ninth pair of nerves.

- 31. Right pneumo-gastric or eighth nerve.

- 32, 32. Pneumo-gastric of the left side.

- 33. Recurrent nerve of the left side.

- 34. Left phrenic nerve.

- 35. Projection of the os hyoides behind the fibres of the mylo-hyoidei muscles.

- 36. Thyro-hyoid membrane or aponeurosis.

- 37. Thyroid cartilage.

- 38. Crico-thyroid membrane.

- 39. Anterior part of the cricoid cartilage.

- 40. First membranous ring or circle of the trachea.

- 41, 41. Thyroid gland.

- 42. Trachea.

- 42', 42'. Anterior aspect of the œsophagus.

- 43. Portion of the surface of the right lung.

- 44. A portion of the left lung drawn forwards and outwards.

- 45, 45, 45. The pericardium laid open and turned back.

- 46. Base of the heart.

- 47. Appendix of the right auricle of the heart.

- 48. Trunk of the pulmonary artery.

- 49. Right branch or division of the pulmonary artery.

- 50. Left branch of the same.

- 51. Remains of the ductus arteriosus.

OBSERVATIONS.

THE parts here exposed are among the most important in the whole body, and the view itself is one of the most beautiful which the knife of the anatomist can lay bare. The violence necessarily done in bending back either half of the sternum supposes the displacement of several parts to a certain amount; nevertheless it requires no great exertion of the imagination to suppose the thorax closed, and then mentally to perceive the precise relative position of the different organs here exposed to view. The sterno-hyoid and sterno-thyroid muscles would then cover more or less completely and immediately the crico-thyroidei muscles, the thyroid

gland, and the origin of the thyroid veins; and more mediately the termination of these and of the mediastinal and subclavian veins. The posterior aspect of the sternum, the neighbouring parts of the cartilages of the three first ribs, the intercostal, and the triangular muscles of the sternum being thus situated in front of the great blood vessels at their origin, and being only separated from them by the anterior mediastinum, it is easy to perceive at what points the ear or stethoscope must be applied, to take cognizance by auscultation of the state of these vessels and their valves. The internal mammary vein is here seen crossing over the first inter-

costal space, behind the artery of the same name, and lying on the outer side of it; but it is evident that this is not the relative situation of these vessels in the natural position of the parts, and that the vein, being on the inner side of the artery, does not cross it.

The precise relative situation and the direction followed by the fibres of several muscles are also very distinctly seen in this plate. The sterno-hyoideus descends but a short way beyond the top of the sternum; the sterno-thyroideus, again, sends its fasciculi even lower than the articulation of the first rib with this bone. Between these muscles and the origin of the sterno-mastoid, the sternum is seen interposed, covered with the ligament which expands upon the fossicula of its upper piece, and proceeds upwards on either side to surround the sterno-clavicular articulations. The course of the internal layer of intercostal muscles is also exposed here, running obliquely from before backwards and extending from the outer margin of the sternum and edge of the rib above to the edge of the rib below, as far as the angles of these bones, by which we are reminded of the origin and contrary course of the fibres of the external layer of the same muscles, which arise from the vertebral column and edge of the rib above, to be implanted into the edge of the rib below, in an oblique direction from behind forwards, as far as the costal cartilages. The course and form of the triangularis sterni are also to be seen, and the origin of this muscle from the more fixed point supplied by the sternum, and its insertion into the more moveable one of the costal cartilages indicate its office to be that of a depressor of the anterior extremities of the ribs, and therefore a muscle of expiration.

The anterior bellies of the digastrici do not always appear conjoined in the median line, as they are in this subject, and they occasionally send a few irregular aponeurotic fibres, which interlace over the os hyoides and complicate the dissection of the mylo-hyoid raphe. The middle tendon of the digastricus, after having traversed the stylo-hyoideus, does not run so much upwards as, in consequence of the fore-shortening, it appears to do in the plate, but more backwards and outwards.

Between the sterno-hyoidei muscles externally, and the thyro-hyoidei, and sterno-thyroidei internally, we generally meet with a notable division of the superior thyroid artery. Immediately under the insertion of the sterno-thyroid muscle we commonly encounter another division of the same vessel, proceeding to the upper edge of the thyroid gland, along which it runs encir-

cling the thyroid cartilage until it meets and inosculates with the corresponding branch of the opposite side. The other divisions of the superior thyroid artery reach the body to which they are distributed by its posterior surface.

On a level with the upper edge of the thyroid cartilage, the common carotid artery divides into the internal and external carotids. The external carotid almost immediately detaches the superior thyroid.

The internal jugular vein always lies on the outside of the trunk of the common carotid. The vena cava superior being situated to the right of the aorta, the left subclavian vein is necessarily longer than the right by at least two finger-breadths. Always situated above, and following in some degree the course of the artery, the subclavian vein for the most part conceals the origin of the arteries which spring from the arch of the aorta; although it occasionally happens that the roots of the arteria innominata and left common carotid are seen underneath the vein. The left subclavian vein receives, as is seen, the inferior thyroid, the superior mediastinal or thymic, and the two internal mammary veins.

The hypoglossal nerve, in its passage from the anterior condyloid foramen along the inferior part of the tongue, always passes on the outside of the great lateral vessels of the neck, and on the inside of the tendon of the digastricus, between the hypoglossus and mylo-hyoideus muscle. The pneumo-gastric or eighth pair, especially in the upper part of its course, is situated more posteriorly, with relation to the great blood vessels, than as it appears in the plate. The great sympathetic cannot be seen in this view of the neck.

The larynx and trachea are the only parts of the air passages upon which operations are performed, at least externally; both are occasionally interested at the same time, when the point selected for operation is that where they are continuous. This view of the larynx and trachea admits of no description being given of their particular structure; but we may just notice the superficial situation of the larynx, covered with the common integument only, and the gradually increasing depth of the trachea as it descends, until on the level of the top of the sternum, it is more than an inch and a half from the surface, the interval being occupied principally with adipose cellular substance often disposed in layers.

Posteriorly and to the left of the trachea, just below the level of the thyroid gland, the œsophagus is perceived. This is almost the only place at which this canal can be opened; higher up or lower down œsopha-

gotomy would be attended with risks too formidable to be willingly encountered or readily overcome.

The front of the œsophagus and trachea, between the thyroid gland and left subclavian vein, the sub-thyroid venous plexus is perceived, whose presence and arrangement complicate the operation of tracheotomy generally, and so often render it both tedious and difficult.

These remarks are but a small portion of all that might be said in connexion with the view here given, yet are they susceptible of numerous applications. At present we shall do no more than say a few words in regard—1st, to Laryngotomy; 2d, to Tracheotomy; 3d, to Laryngo-tracheotomy, operations which have all been included under the general but objectionable title of *bronchotomy*; and 4th, to œsophagotomy.

1st. The windpipe is opened variously, under various circumstances: when the object of the operator is to make a new passage for the air, or to procure the exit of a small body which has entered accidentally into the trachea, the *crico-thyroid* membrane is the part usually divided; were the foreign body lodged in the ventricles of the larynx, it would be proper to divide not only the membrane in question, but the thyroid cartilage itself to a greater or less extent, and, were it ascertained to be of large size, no hesitation should be felt in cutting completely through both the thyroid and cricoid cartilages, as well as several rings of the trachea.

Division of the Crico-thyroid Membrane.—The patient must be laid on his back, with his chest somewhat raised and his head thrown back; the surgeon then with his left hand steadies the parts he is about to operate on, and with a scalpel in his right divides the integuments along the median line of the larynx, from the level of the thyroid cartilage to the extent of about an inch below it. This incision should implicate the skin, and the cellular substance interposed between the contiguous edges of the sterno-hyoid muscles. The crico-thyroid membrane is then readily distinguished, and using the nail of his left forefinger as a director, the surgeon pierces it transversely and inserts the canula, which he has at hand for the purpose.

Division of the Thyroid Cartilage.—The crico-thyroid membrane being divided in the manner directed, a grooved director is passed behind the cartilage, upon which it is then divided from below upwards, with a knife of sufficient strength.

Division of the Trachea, or Tracheotomy.—This operation is more difficult and more dangerous than those which have already been described. The position

of the patient is the same, but the integuments require to be divided from the level of the cricoid cartilage to the top of the sternum, and the subthyroid plexus of veins must be encountered carefully and dexterously, to be prevented from giving great trouble, and embarrassing all the subsequent steps of the operation. When the trachea is fairly brought into view, the surgeon places the forefinger of his left hand in the inferior angle of the wound, and guiding his knife upon this, he divides, from below upwards, one, two, three, or four rings of the trachea, according to the end proposed,—the magnitude of the body to be extracted, etc.

Œsophagotomy.—It is impossible here to enter into a detail of the circumstances which may render the operation of œsophagotomy necessary. Suffice it to say that it is scarcely ever undertaken save to extract foreign bodies, most usually bones, which have stuck in it, and whose presence brings the life of the patient more immediately or remotely into danger. When it is resolved upon, the patient is to be laid as in bronchotomy, but with his face turned to the left, whilst the head is thrown backwards and to the same side. The surgeon then divides, with a single stroke of the scalpel, the skin, platysma myoides, and cellular substance, through an extent of three inches or thereabouts, along the anterior margin of the sterno-mastoid muscle and over the situation presumed or ascertained of the foreign body to be extracted. He pushes the sterno-mastoid and sterno-thyroid muscles outwards, raises the left lobe of the thyroid gland, and penetrates with the handle of the scalpel into the space which separates the trachea from the œsophagus. The surgeon now punctures the latter with the point of his knife, and introduces a grooved director, upon which he enlarges his incision upwards, and downwards if need be. It is easy to avoid the arteries in front of the larynx which lie in the way of the incisions necessary in this operation; should any branch of importance enough to bleed be divided, it is readily and ought to be immediately secured.

The wounds inflicted in all the operations enumerated should be dressed as lightly and simply as possible. Wherever it is possible the edges of the incisions should be brought together immediately, and retained by means of adhesive straps or a few points of suture. An easy position is also of great importance. That in which the patient feels himself most comfortable will in general be found the best. It is always necessary to administer nourishment to patients after œsophagotomy by means of an œsophagus tube.

PLATE II.

OCCIPITO-CLAVICULAR REGION.

ADULT: NATURAL SIZE.

To obtain the clearest possible view of the parts in this region, the shoulder of the subject has been very much depressed and pushed backwards, the neck stretched out, and the face turned to the left.

- A. Occiput.
- B. Side of the head.
- C. Top of the right cheek.
- D. The lower part of the chin.
- E. The front of the neck.
- E'. The nape of the neck.
- F. The shoulder.

G, G. The upper part of the chest.
a, a, a, a. Cut edge of the skin, from the occipital region to the upper part of the shoulder.

- b, b, b. The skin of the throat.
- c, c. The platysma myoides divided.
- d, d, d. Anterior edge of the clavicle.
- e. Sterno-clavicular articulation.
- f. Mastoid process.

Muscles.

- 1. Origin of the occipito-frontalis muscle.
- 2, 2, 2. Trapezius muscle.
- 3, 3. Superior extremity of the sterno-cleido mastoid muscle.
- 4, 4. Anterior or sternal fasciculus, and 4', 4', posterior or clavicular fasciculus of the muscle.
- 5. Part of the complexus major muscle.
- 6. Posterior auris muscle.
- 7. A small portion of the sterno-hyoideus.
- 8. A small portion of the subclavius.
- 9, 9, 9. Splenius capitis.
- 9', 9'. Splenius colli.
- 10, 10. Triangularis scapulæ.
- 11. Anterior fasciculus of the scalenus posticus.
- 12. Posterior fasciculus of the same muscle.
- 13. Scalenus anticus.
- 13', 13'. Omo-hyoideus.

- 13''. A small portion of the fascia of the neck attached to the inferior margin of the omo-hyoideus.

14. Clavicular portion of the pectoralis major.

15. Sternal portion of the same muscle.

16. Deltoid.

16'. Layer of dense cellular substance, or anterior fascia of the axillary veins.

Veins.

- 17. Occipital vein.
- 18 and 19. Branches and trunk of the external jugular vein.
- 20. The venous trunk cut and tied at its entrance into the external jugular, which collects the greater number of the superficial veins of the region.
- 21. A large and pretty regular venous branch, which establishes a communication between the superficial anterior veins of the neck and the internal jugular, here concealed by the posterior fasciculus of the sterno-cleido-mastoid muscle.
- 22, 22. Acromial and cephalic vein.

Arteries.

- 23. Posterior auris.
- 24. Occipital.
- 24'. Division of this artery.
- 25. Superficial transverse cervical.
- 26. Deep transverse cervical, with its subdivisions.
- 27. Arteria innominata or brachio-cephalic.
- 28. Common carotid.
- 29. Subclavian.

30. Division of the pectoral arteries.

31. Acromial branch.

32. Cutaneous branches.

Nerves.

- 33. Posterior branch of the sub-occipital nerve.
- 34. First root; 35, second root; 36, third root of the cervical plexus.
- 37. A nerve of the cervical plexus which turns over the posterior edge of the sterno-mastoid muscle, and runs to its destination in close contact with the outer surface of this muscle.
- 38. Smaller branches of this nerve.
- 39. Smaller root, and 40, larger root of the phrenic nerve.
- 41. Trunk of the phrenic.
- 42, 42. Supra-sternal.
- 43, 43. Supra-clavicular, and 44, supra-acromial branches of the cervical plexus.
- 45. Branches of the same plexus proceeding to the trapezius muscle.
- 46, 46. Branches divided, which pierce the platysma myoides and are distributed to the integuments and cellular substance of the neck.
- 47, 47. Branches of communication between the different nerves of the cervical plexus.
- 48. A branch sent to the trapezius.
- 49. Post-clavicular branches.
- 50. Deep branch of this plexus.
- 51, 51. Roots of the brachial plexus.
- 51'. Supra-scapular nerve.
- 51. Pneumo-gastric, or nerve of the eighth pair.

OBSERVATIONS.

THE general view here presented may be conveniently divided into several regions. There is a distinct depressed conical shaped space bounded on the sides by the opposite edges of the trapezius and sterno-mastoid muscles and at the base by the clavicle, and this space itself is naturally divided into two unequal halves by the omo-hyoideus muscle. The lower and smaller of these

portions is the only one that requires to be particularly named; it has been appropriately called the omo-clavicular space by M. Velpeau.

Between the sternal and clavicular portions of the sterno-cleido-mastoid muscle, at their point of origin, and for an inch and a half or more above it, there is an interval very well marked in muscular subjects, less so

in those that are of spare habit. It is frequently concealed by a slip of scattered fibres running obliquely between the one fasciculus of the muscle and the other. It may be designated the *interfascicular space* of the sterno-mastoid muscle.

There are, farther, two intermuscular spaces of different forms and sizes, and of very dissimilar importance, which require to be mentioned. The one of these extends upwards in a triangular form, between the edge of the trapezius and sterno-mastoid muscles, from the level of the omo-hyoideus. At its upper part it is crossed by the occipital artery and vein, and this is the point at which these vessels might be sought for, opened, tied, etc., as occasion required.

The other space is bounded by the clavicle above, and on either side by the deltoid and pectoralis major muscles. Its bottom is occupied by a quantity of cellular membrane, in communication with that which lies under the pectoral and deltoid muscles. Several vessels of the third or fourth order in point of size, lie in front of this cellular tissue, which has behind it the subclavian muscle, the axillary artery and vein, etc., organs all of the highest importance.

Portions of many muscles which have already been referred to are seen in the superior of these two spaces, such as the *splenius*, formerly always, and still occasionally spoken of as consisting of two portions, the *splenius capitis* and *splenius colli*; the *triangularis*, or *levator anguli scapulæ*, which makes a half turn upon itself between its attachments to the transverse processes of the three or four superior cervical vertebræ and its implantation into the posterior angle of the scapula. The *scalenus posticus*, but partially separated from the *scalenus anticus* by the roots of the brachial plexus of nerves and the subclavian artery, always consists of several fasciculi, and anterior of which is the longest and fusiform. The posterior fasciculus alone is truly triangular or scalene, as is here perceived. The *scalenus anticus* is attached to the first rib immediately behind the clavicle: in front of it we observe the trunk of the external jugular vein; and its outer aponeurotic edge is one of the main guides to the surgeon in discovering the subclavian artery. The *omo-hyoideus* only appears so tense and horizontal as it does in the plate on account of the extreme depression and retroversion of the shoulder. The *fascia cervicalis* retains it in proximity to the sternum, and prevents it from stretching in a straight line from the os hyoides to the tip of the shoulder, where it is attached inferiorly. The importance of this muscle

in leading the surgeon to the subclavian artery must also be apparent.

At the bottom of the *interfascicular space* of the sterno-cleido mastoideus, at the depth of between three and four inches, we encounter a small piece of the sterno-hyoideus muscle, and the division of the arteria innominata into common carotid and subclavian. The division of the innominata, however, often takes place lower down; and this is a point of great consequence to be noted.

The branch of communication 21, between the external veins of the neck and the internal jugular, is, as has been said, pretty constant; but the pneumo-gastric nerve (52) is invariably encountered in the place in which it is figured, and never fails there to send off the recurrent branch. At the distance of a few lines on the outer side of the pneumo-gastric nerve, runs the internal jugular vein, here concealed by the clavicular fasciculus of the sterno-cleido-mastoid muscle.

The parts comprised within the superior triangular space that is bounded on either side by the edges of the trapezius and sterno-mastoideus and below by the omo-hyoideus, are relatively of less importance. The point at which the occipital nerve pierces the trapezius, may be noted, although this is not quite determinate, for it is in one case more internally, in another more externally that it makes its appearance. The precise course of the posterior and outer edge of the sterno-mastoideus ought to be well known, inasmuch as it is always covered with many nerves, and at its lower part generally indicates the course whilst it supports the main tributaries of the external jugular vein.

It is in front of the levator scapulæ and between the superior attachments of the scaleni, that the three first visible roots of the cervical plexus of nerves make their appearance and anastomose. This plexus is never the same in two subjects. It has been carefully and minutely dissected, as well as very faithfully drawn in the plate.

The superficial and deep transverse arteries of the neck only appear high from the depression of the shoulder. The superficial branch arises from the ascendens cervicis, concealed by the posterior fasciculus of the sterno-mastoid muscle; the deep one springs from the trunk of the subclavian itself.

The precise situation of the subclavian artery in the omo-clavicular space is well worthy of attention. It advances with a *curve*, as here represented, *obliquely downwards and outwards* in the great majority of instances, and never *almost horizontally* as it has been described to do. The vessel lies at this point *above*

the clavicle, the course of which it approaches at an acute angle, under the omo-hyoideus, on the outside of the scalenus anticus, and on the inside of the brachial plexus, from three to four eighths of an inch behind the whole of these parts, and embedded among dense cellular substance. Behind the scalenus anticus and the posterior bundle of the sterno-mastoid, the artery sends off several important branches,—the inferior thyroid, the vertebral, etc. It is this last vessel especially, which, appearing to drag the main trunk of the subclavian upwards shortly after its origin, alters its curve and changes its original direction.

There is no part of the body the structure of which is complicated in a greater degree than that of the neck; and there is perhaps no region, with the exception of that of the orbit, the diseases of which are so numerous and varied. It were foreign to our purpose to enter into the consideration of any of these in detail; of course it would be out of place to say anything whatever of the affections of the trachea, larynx, thyroid gland, œsophagus, and pharynx, organs which all lie out of the bounds of the region which now occupies our attention.

Wounds of every description are frequently encountered on the side of the neck; and it is easy to imagine how readily and gravely these may be complicated by injury done to the nerves, vessels, etc., which are there met with in such abundance. In thin subjects the nervous roots, and the intervertebral foramina through which they pass, are almost immediately under the skin; so that the former may readily be cut at the point of their emergence, whilst the latter may be entered by a sharp and pointed instrument and the spinal cord itself sustain an injury.

It is evident that no operation, such as the search for and the extraction of a bullet, the examination of a wound, or the application of suitable dressings and bandages, can be undertaken in this region without an accurate knowledge of the parts which enter into its formation. Abscesses on the side of the neck require to be opened at an early stage, lest the matter, instead of making its way to the surface then, should penetrate into the thorax; yet the trifling operation required to give issue to the matter in these cases cannot be performed without a due knowledge of the anatomy of the parts, and this not being possessed so generally as it ought to be, leads to the employment of caustic instead of the knife.

The other operations which the surgeon is liable at every instant to be called upon to perform upon the neck, are as various as the diseases and accidents themselves to which the region is liable, and cannot be determined beforehand. Here we shall only speak of the operation required in order to place a ligature upon the subclavian artery, and of the more simple procedure employed in bleeding from the jugular vein.

LIGATURE OF THE SUBCLAVIAN ARTERY.

The reasons which induce the surgeon to attempt the obliteration of a vessel so large as the subclavian, and situated so near the centre of the circulatory apparatus must always be cogent, perhaps even desperate, and experience is not favorable to the entertainment of very sanguine expectations of ultimate advantage, even after this formidable operation is achieved. Still there are cases on record in which the ligature of the subclavian artery has been crowned with complete success, and this being so, will always justify the surgeon in making this last effort for the safety of his patient. It must be evident that the operation of tying the subclavian artery is never undertaken on account of diseases of the subclavian itself, unless indeed the procedure of Brasdor, which consists in tying a vessel below or beyond the part affected, is adopted; or unless the disease happens to be situated at the very extremity of the vessel where it is about to become axillary, when the ligature is applied to the trunk at its origin, on the inner side of the scaleni muscles. But the attempt to tie the subclavian artery before its entrance among the scaleni, or even as it is passing between these muscles, is fraught with too much danger and difficulty to be undertaken in any but the most desperate circumstances. It is consequently to arrest hemorrhage from the axillary artery, or for the cure of aneurism of this vessel, that the subclavian is usually tied. To check aneurism of the subclavian, it were necessary to operate upon the trunk of the arteria innominata, a step which probably is not to be recommended under any circumstances. The best and perhaps the only good point at which the subclavian can be laid bare is on the outer edge of the scalenus anticus and immediately above the clavicle.

We have been recommended to make the external incision in several directions—horizontally, vertically, and obliquely. To us it seems that it would be more in unison with the lie of the parts, and also more convenient, to divide the skin in a twofold direction: 1st,

vertically in the line of the outer edge of the scalenus anticus; and 2d, obliquely from above downwards, and from without inwards, in such wise that the two incisions should meet superiorly and be separated to the extent of two finger-breadths inferiorly; the flap thus formed would be readily turned down, and the vessel certainly attained without the risk being incurred of wounding anything. After the first incisions are made, the use of the cutting edge of the knife must be given up, and its handle employed in separating the cellular substance which then alone intervenes between the surgeon and the vessel. This once attained, there can be no difficulty experienced in passing a ligature around it, modern surgery having invented not one, but several instruments adequate, under all circumstances, to accomplish this end.

BLEEDING FROM THE JUGULAR VEIN.

Bleeding in the neck is only practised from the jugular vein, and is not very general. Bosquillon, who recommended it frequently, tells us that, on one or two occasions within a very short space of time, this operation, so simple in itself, was followed by fatal consequences. Inspection of the parts after death showed that in each instance one of the roots of the cervical plexus had undergone alteration, having been partially divided in the operation.

The jugular vein is occasionally of small size, and the surgeon cannot then succeed in making it become turgid by pressing with his finger under the point at which he proposes to insert his lancet; in this case a ligature is indispensable; but it is evident that a circular ligature of the neck is inadmissible, more particularly in cases of apoplexy, those in which, above all others, bleeding from the jugular vein has been recommended. Graduated compresses of sufficient size to prevent the circular bandage which keeps them firmly applied from pressing upon the larynx or trachea, must therefore be placed over each of the veins as they are turning over the posterior edge of the sterno-mastoid muscles. The patient should, if possible, be seated, and an assistant must support his head. His shoulder and chest should be covered with several folds of linen, and the surgeon must be stationed on the side upon which he is about to operate. The thumb of the left hand is then to be planted a little below the point of the vein at which he proposes to puncture it, and the lancet is pushed with the right into the vessel almost transversely, a free incision being made, as it is always a matter of moment

to detract blood quickly when the jugular vein is opened. A few fibres of the platysma myoides are necessarily divided in the operation. The blood does not flow in a jet, but wells out in a copious stream, if the incision have been large enough. It may be readily collected in a basin by pressing the edge of a card rounded into the form of a gutter under the bleeding orifice. The bleeding always ceases on the bandage being removed. A little piece of lint, confined with sticking plaster, should be put over the wound by way of dressing.

The sterno-mastoid and platysma-myoides muscles of both sides of the neck must act harmoniously, to preserve the head in its natural straight position. One or other or both of these muscles of either side being affected with paralysis, or with spasm, or permanent contraction, or suffering a loss of substance, or being divided, etc. it is easy to conceive the kind of derangement which must ensue; nor does it seem necessary here to expatiate upon the nature of the measures which are required to counteract each variety of lesion of the description alluded to.

To conclude, the mere inspection of the neck generally, or of that portion of it which particularly engages our attention, sometimes suffices to give the practitioner a hint in regard to the predisposition to certain diseases, and even enables him to discover the existence and the seat of several of them. It would appear that the length and general form of the neck are more or less intimately connected with the development and shape of the chest, with the volume and disposition of the thoracic viscera. The *venous pulse*, or the pulsation occasionally exhibited by the veins, is never more evident than in the veins of the neck, and in the external jugular vein in particular. This phenomenon, as is now well known, depends in part on the accumulation of the blood in the great venous trunks that enter the right auricle of the heart, in which it stagnates momentarily until forced onwards through the lungs, and in part on the reflux of the blood within the veins at the moment when the right auricle contracts: the blood encounters a certain amount of obstruction to its onward course; it therefore reverts partially upon the veins, which thus appear to pulsate synchronously with the heart. This stagnation carried to excess becomes a serious malady, so that any thing like unusual pulsation of the veins of the neck may be taken as a certain indication of an important disease within the cavity of the thorax.

PLATE III.

SUBMAXILLARY REGION.

ADULT: RIGHT SIDE—NATURAL SIZE—STRONG AND MUSCULAR SUBJECT.

- A. The right auricle.
 B. The middle of the cheek.
 C. The under lip.
 C'. The prominence of the left cheek bone.
 D. The under part of the chin.
 E, E. The sides; and
 F, F, F, F. The front of the neck.
 G, G. The shoulders.
 H, H. The collar bones.
 I, I. The sternum between the collar bones.
 K, K. The front of the chest.
 a, a, a. The lower edge of the body of the under-jawbone.
 b. The body; and b', b', the great cornu of the os hyoides.
 c, c. The upper surface of the clavicle.
 d, d, d. The division of the integuments along the middle line of the neck to the top of the sternum, and across the cheek.
 e, e, e. Sub-cutaneous adipose cellular tissue.

Muscles.

- 1, 1, 1. The masseter muscle.
 2, 2. A portion of the buccinator muscle.
 3. The triangular oris muscle.
 4. The quadratus geni muscle.
 4'. The platysma myoides.
 5. Posterior belly of the digastric muscle.
 5', 5'. Middle tendon and anterior belly of the same muscle.
 5'', 5''. Aponeurotic expansion of the mid-

- dle tendon of the digastric muscle, which attaches it to the os hyoides, and adheres to the lower part of the anterior surface of the mylo-hyoideus muscle.
 6, 6. The stylo-hyoideus muscle.
 7, 7, 7. Mylo-hyoideus muscle.
 8, 8, 8. Hyoglossus muscle.
 8'. Attachment of the superior fasciculus of the triangularis scapulæ to the lateral tubercle of the atlas.
 9, 9, 9. The platysma myoides; this muscle and the skin which covers it anteriorly, are turned over on the side of the neck.
 10, 10, 10. The sterno-cleido-mastoideus muscle.
 12. The inferior constrictor muscle of the pharynx.
 13 and 14. Sterno-thyroideus and thyro-hyoideus muscles.
 15, 15, 15. Omo-hyoideus muscle.
 16, 16, 16. Sterno-hyoideus muscle.
 17, 17. Pectoralis major muscle.
 18, 18, 18. Layer of cellular membrane, entitled the *fascia of the neck*.

Veins.

- f, f, f. External jugular vein.
 g, g. Internal jugular vein.
 h, h, h. Facial, submaxillary, and laryngeal veins, running towards h', and discharging themselves into the internal jugular vein.

Arteries.

- i, i. Right common carotid artery.
 i', i'. External and internal carotid arteries.
 k, k. Lingual artery.
 l, l, l. External maxillary or facial artery.
 m, m. Sub-mental divisions of this artery.
 n. Superior thyroid artery, with its numerous subdivisions.

Nerves.

- 19, 19. Nerves of the cervical plexus which surround the sterno-mastoid muscle.
 20, 20. Facial and cervical twigs of the cervico-facial branch, or portio dura of the 7th pair.
 21. Pneumo-gastric or 8th pair of nerves.
 21'. Spinal nerve.
 22. Descending branch of the hypoglossal, or 9th pair of nerves.
 23. Superior laryngeal nerve.
 24. Great hypoglossal nerve.

- o, o. Parotid gland.
 p. Submaxillary gland.
 q, q. Dotted lines, showing the whole extent of this gland.
 r, r. Lateral portion of the thyro-hyoid membrane.
 s. Anterior portion of the same membrane.
 u. Superior and posterior angle of the thyroid cartilage.
 v. Oblique line of the thyroid cartilage.

OBSERVATIONS.

THE head is thrown back and so turned that the occiput is towards the right shoulder, and the face towards the left; the cheek is directed upwards and forwards to the right. This position has been chosen to give greater prominence to the submaxillary triangular space, and to render it more accessible to the operator; this triangle, which forms the bottom of the region here represented, and which is bounded superiorly by the inferior edge of the body of the jaw and the inferior extremity of the parotid gland, on the

outside, by the anterior edge of the sterno-mastoid muscle, and on the inside by the median line, is very exactly indicated here by the vertical section of the integuments.

The head has not been brought into this position without causing a great degree of tension of the parts in front of the neck, and without producing a notable increase in the apparent breadth of the neck itself.

The submaxillary region is extremely complex; and one of which it is difficult to give a good description,

without altering the relative situations of the parts it comprises. The submaxillary gland especially, whose form and precise situation are in themselves points of importance, obscures the view of several interesting parts, if left in its integrity; it is on this account that the gland is here represented reduced in size, and its original dimensions indicated by a line only.

The parts are all strong, the muscles well developed, the nerves of large size; the carotid artery is moderately injected; the internal jugular vein was full of black blood, and did not require any artificial distension. The external jugular vein is represented at some distance on the outside of the sterno-mastoides; it is also double in the middle of its course, and receives no more than a single small branch, which comes from the posterior and upper part of the neck. It is well to bear in mind these and various other varieties of structure.

The cervical fascia is here seen of great strength between the pillars of the sterno-cleido-mastoides, behind the inferior extremity of the jugular vein, and rising from the upper edge of the clavicle to the inferior edge of the horizontal portion of the omo-hyoideus muscle. We already know that this layer of condensed cellular tissue conceals many important organs, among others the subclavian vessels.

The two most important portions of the region are the two neighbouring and unequal triangular spaces, the boundaries of which are very well indicated here, and which (and this is a point of more importance) are easily made out on the living subject. Of these two triangular spaces, the *superior* (bounded above by the lower margin of the under-jawbone, below by the posterior belly and tendon of the biventer maxillæ muscle, in front by the anterior belly of this muscle) may be entitled the *submaxillary triangular space*, and contains—1st, the submaxillary gland; 2d, the facial vein, which always lies in front of the gland; and 3d, the facial artery, which, on the contrary, is almost always concealed by the gland. The lingual artery also crosses this space, but at the distance of about a finger's breadth higher than its commencement, and lying still more deeply.

Besides the diseases incidental to the submaxillary gland, and the injuries to which the facial artery and vein are liable, this space in infancy, and early youth especially, is thickly beset with lymphatic glands, which are but too frequently the seat of inflammation and

abscesses, that leave behind them puckered and characteristic scars. The prudent surgeon does not allow these abscesses to burst spontaneously, but gives vent to the matter some short time before it attains the surface.

Above this submaxillary space, we observe the outer aspect of the body of the lower jawbone, covered posteriorly with the masseter, anteriorly with the triangularis oris and quadratus geni muscles, and traversed in the middle by the facial vessels. The platysma myoides covered the masseter and the facial vessels as far as the edge of the triangularis, beneath and athwart which muscle it is generally believed to blend its fibres with those of the quadratus geni.

The *inferior triangular space* for which it might be found difficult to find an appropriate title, is bounded superiorly by the digastric muscle, outwardly by the sterno-mastoides, and internally by the projection of the larynx. The parts which it includes are the following, enumerating them from the outer towards the inner boundary of the space, and on a superficial plane: the facial vein, and the laryngeal venous branch of the same; the lingual and superior thyroid arteries; more profoundly, the internal jugular vein and the common carotid artery; and still more deeply, the spinal, descendens noni, pneumo-gastric, great sympathetic, and superior laryngeal nerves, to say nothing of the roots of the cervical plexus. The descendens noni and the pneumo-gastric, which always lie behind the great vessels, on the outside of the sympathetic, have been raised from their situation, and are maintained in front of and between the two great vessels, upon a pin.

The carotid arteries and jugular veins, are the principal vessels which transmit and return the blood to and from the head, and the calibre of these conduits, especially of the veins, cannot be altered without serious risk of injury to the functions of the brain. Excessive compression of the neck, however, does not merely occasion death by preventing the access of the red blood to the brain, and the return of the venous, but by producing obliteration of the trachea, and interrupting respiration.

The deep position of the great vessels of the neck by the side of and almost behind the laryngeal protuberance, shows the reason why the unfortunate suicide so frequently fails in his attempt to put a period to his existence by cutting his throat; he only severs the wind-pipe when he intends to divide the great vessels of the neck: it is then that, alarmed for the first time with what he has so long meditated, he attempts to call for help and finds the power of utterance gone.

The common carotid is more exposed to wounds when it has got above the sterno-mastoideus than whilst it is still behind and protected by this muscle, as it is through the two inferior thirds of its course. A wound of the artery in this situation is almost always and very speedily fatal. Were there an able surgeon at hand, however, he might occasionally, by a bold but perilous operation, save the life of the patient. A wound of the internal jugular vein of any extent is an accident not less dangerous than that of the carotid artery; there is even greater danger if possible in this case than in the other—the air may get into the vein and cause the instant death of the patient, by filling the cavities of the heart; moreover, it is pretty well ascertained that neither the ligature nor compression commonly prove of any avail in averting a fatal issue when such vessels as the internal jugular vein are wounded.

The simple inspection of this region must admonish us of the necessity of using every care and taking every precaution against wounding important organs, whilst performing the slightest operation upon parts situated over the vessels of the neck, especially immediately below the line of the horizontal portion of the digastric muscle. Above this line and elsewhere we may be bolder, inasmuch as these vessels are there situated more deeply, and those of their tributaries which are exposed to be injured are readily secured by the ligature, or obliterated by being compressed or twisted.

It is a good general rule, in operating upon the neck, to direct the incisions vertically, or to follow as closely as possible the course of the muscles which are likely to be implicated.

LIGATURE OF THE ARTERIES OF THE SUBMAXILLARY REGION.

These arteries are, as we have seen, the common carotid and its great divisions,—the external and the internal carotids, the external maxillary, the lingual and the superior thyroid. The external and internal carotid arteries are never tied separately, unless indeed they be encountered one after the other in the course of an important operation, or unless the surgeon has had the misfortune to wound either of them; and this for two sufficient reasons: the first, because it would be difficult, not to say impossible, for the most dexterous anatomist to distinguish them for certain; the second, because there is no greater risk incurred in tying the common trunk than in securing either of the great divisions singly.

Ligature of the Common Carotid.—This was one of the vessels which it was long believed was incapable of being tied consistently with the safety of the patient. The English surgeons were the first to show the futility of this ancient notion; and the ligature of the carotid artery is now known to be attended with so little danger, and is at the same time so easily accomplished, that the vessel has of late been repeatedly tied, upon what, on strict investigation, might occasionally be maintained to be very insufficient grounds, such as neuralgic pains of the face, etc. The carotid artery has now been tied upwards of fifty times, generally with success, and by surgeons of every country in Europe.

It is not always on account of an aneurism or of wounds of the trunk of the carotid, or of some one of its branches, that this vessel is tied; the operation is sometimes undertaken when the lower jaw is amputated, (although here it might surely always be avoided,) when the parotid gland is to be extirpated, and when cancerous and fungous tumours are to be removed from the vicinity of the jaws. To conclude, it is sometimes performed to check the growth, and effect the cure of the bloody tumours, of the aneurisms by anastomosis, etc., which are developed in the orbit and in other parts of the face.

During the performance of the operation, the patient should be laid on his back, with his chest raised, the neck moderately stretched out, and the face turned to the opposite side from that upon which it is intended to tie the artery. The surgeon now feels for the angle of the jaw, and carries his first incision, which should divide the skin and platysma myoides, from under this point to about the middle of the neck, following the line, but at a short distance on the inside of the anterior edge of the sterno-mastoid muscle. The cellular tissue is now exposed, in which the *superficial cervical plexus* of nerves is distributed. By examining attentively with the finger the main trunk of the artery and two of its branches at least, the superior thyroid and the lingual may now be always discovered, and a careful and gradual dissection of the laminæ of cellular substance encountered, leads at length to the great vessels,—the internal jugular vein and the carotid artery lying side by side, the vein externally, the artery internally. The vessels once brought fairly into view, the surgeon must be careful to detach as little as possible of the tissues around them, and above all he must be careful not to puncture the vein. The only part of the operation that now remains is, by means of a convenient aneurismal needle, to pass the thread under the artery with which

it is to be secured, great care being taken, before tying the knot, to ascertain that none of the neighbouring nerves are included in the ligature.

It must be understood that what has now been said in regard to this operation, is intended to apply only in so far as the view of the parts or the region presented in this plate is concerned.

Ligature of the superior thyroid, lingual, and external maxillary or facial arteries.—There is but little to be said in regard to the ligature of the superior thyroid. The incision ought to run in the same direction as that for the ligature of the carotid, but may be made considerably less in extent. The lingual artery might be very well secured through an incision of the same description, only the position of the vessel at a greater depth would require a greater share both of address and caution on the part of the operator. Were it necessary

to tie the facial near its origin, it would be best to make the first incision from the angle of the jaw in the direction of the body of the os hyoides, to proceed cautiously till the submaxillary gland came into view, avoiding the facial vein which lies over it, and then to raise the gland, in order to reach the vessel which runs under it.

The nerves which run in the vicinity of the great vessels of the neck, as also the branches of the facial which lie over them transversely, are extremely numerous, and necessarily require to be well known. The *spinal*, the *pneumo-gastric*, the *descendens noni*, and the *superior laryngeal*, have all been made the subjects of experiment by the experimental physiologists, the results of which, and inferences to be deduced from them, are of the highest interest: into this subject it would be foreign to our purpose to enter in this place.



PLATE IV.

SUPRA-CLAVICULAR, AND CERVICAL REGION.

RIGHT SIDE—ADULT FEMALE OF SMALL STATURE—NATURAL SIZE.

In this view the parts are prepared in the following manner:—The integuments are divided on a line, commencing two finger-breadths to the outside and right of the symphysis menti, and carried downwards, in the direction of the sterno-clavicular articulation of the same side, nearly as low as the level of the third rib; from the top of this vertical incision another is carried obliquely downwards, nearly in the line of the axilla; the flap included between these two cuts is dissected off. The parts of the sternum and of the inner end of the clavicle to which the sterno-cleido-mastoid muscle is attached, are divided with a fine saw; and the piece of bone thus removed, still adhering to the extremity of the muscle, is turned over to the right side. The subject from which the drawing is made offers a marked contrast in the delicacy and small size of the muscles especially, to the large size of the same organs and the general indications of vigour presented in the last plate.

- A. Concha, or external ear.
- B. The cheek.
- C. The lips.
- D. The chin.
- E. The side of the neck.
- F. The angle of the jaw.
- G. The under part of the chin.
- H. The front of the neck.
- I, K. The upper parts of the shoulders.
- L. The outer extremity of the right clavicle.
- M. Middle of the left clavicle.
- a, b. Detached portions of the sternum and clavicle, to which the lower attachments of the sterno-cleido-mastoid muscle adhere, turned back.
- c. Section of the articular cartilage and of the double synovial membrane, which lines the sterno-clavicular articulation.
- d. Superior surface of the clavicle.
- e. Anterior surface of the sternum.
- f. The flap of skin which covered the sternum, turned back.
- g, g. Line of section of the integuments in front of the neck, near the median line.
- g', g'. Oblique incision of the common integuments, drawn aside and partially turned over, along with the platysma myoides, and the mastoid muscle, which are intimately connected with them.
- h, h. The flap of skin and fatty cellular substance that covered the front of the chest, turned down.

- i. Between the skin and sterno-thyroideus muscle, above the sternum, there is always a quantity of cellular substance interposed.
- k. Submaxillary gland.
- l. Oblique line of the thyroid cartilage.
- m, m. Part of the thyro-hyoid membrane.

Muscles.

- 1 and 2. Middle tendon and anterior belly of the digastricus.
- 3, 3. Mylo-hyoideus.
- 4. Stylo-hyoideus.
- 5. Hyoglossus.
- 6. Constrictor inferior of the pharynx.
- 7. Thyro-hyoideus.
- 8, 8. Omo-hyoideus.
- 9, 9. Sterno-thyroideus.
- 10, 10. Sterno-hyoideus.
- 11. A small portion of the sterno-thyroideus of the left side.
- 12, 12. Rectus capitis anticus major.
- 13. Longus colli.
- 14, 14. Scalenus anticus.
- 15, 15. Scalenus posticus.
- 16, 16. Sterno-cleido-mastoideus.
- 17, 17. Platysma myoides.
- 18, 18. Pectoralis major.

Veins.

- n. Cava superior.
- o. Right subclavian.
- p, p. Internal jugular.
- q, q. Lateral thyroid.
- r. Lateral of the neck.
- s. Another lateral cervical branch.
- t, t. Veins tied at their entrance into the internal jugular.

Arteries.

- 20, 20. Subclavian.
- 21, 21. Vertebral.
- 22, 22. Ascending cervical branch.
- 23. Superficial transverse of the neck.
- 24, 24. Common carotid.
- 25, 26. External and internal carotids.
- 27. Superior thyroid.

Nerves.

- 28. Hypoglossal or ninth nerve.
- 29. Superior laryngeal.
- 30, 30. Pneumo-gastric or eighth nerve.
- 31, 31. Great sympathetic.
- 32. Middle cervical ganglion.
- 33, 33. Anastomoses of the descendens noni, with a branch of the cervical plexus.
- 34, 34. Twigs proceeding from these innervations, distributed to the sterno-thyroid, hyoid, and omo-hyoid muscles.
- 35, 35. Recurrent nerve.
- 36. Cardiac branch.

OBSERVATIONS.

THE muscles particularly, are, in this subject, evidently upon a smaller scale than they were in that from which the view given in the last plate was taken. The aponeurosis of the digastricus is weak here, and scarcely to be distinguished from the mylo-hyoideus. The small triangular space bounded by the hyoglossus, thyro-hyoideus and constrictor inferior pharyngis, in which the superior laryngeal nerve expands, is here very distinctly seen, much more so indeed than it ever can be in muscular subjects.

The rectus capitis anticus major and longus colli, which are generally concealed by the internal jugular vein and carotid artery, are here apparent between these vessels, in contact with the descendens noni, the pneumo-gastric and great sympathetic nerves, and separated inferiorly by the vertebral artery. The several parts are thus distinct only from their tenuity, in consequence of the thinness of the subject and their flaccidity, they having fallen away from one another when the cellular substance connecting them naturally was removed. The sterno-hyoid muscle, whose outer edge here covers but two-thirds of the calibre of the common carotid artery, is frequently so broad as to conceal it entirely. The course and different appearance of the sterno-thyroid and sterno-hyoid muscles are very apparent, the first being posterior, vertical, and of considerable breadth; the second, narrow, oblique, and fusiform.

The great blood-vessels of the region are normal. The vertebral artery here gives off the ascending and superficial transverse of the neck. The position of the different venous branches, entering the internal jugular vein, are particularly deserving of attention.

The nerves present some slight varieties in their mode of distribution. The hypoglossal is round, instead of being flattened as usual; and the superior laryngeal is sinuous until it begins to split into twigs. The great sympathetic is slender, and the situation of its middle cervical ganglion is somewhat lower than usual. The recurrent generally only begins to divide into branches higher up, i. e. about the level of the thyroid gland, and when it has approached the mesial plane more closely than it does in this subject.

We have before us in the present view the whole of the parts interested in the operations performed upon the common carotid and upon the subclavian arteries. A glance back to Plate II exhibits the trunk of the arteria innominata scarcely rising higher than the middle of the space between the sternal and clavicular origins of the sterno-cleido mastoideus, before it divides into common carotid and subclavian arteries. In this plate (Pl. IV) we have these vessels (and especially the carotid) exhibited in their farther course. From the point of division the subclavian ascends upwards and backwards, at some distance from the lower extremity of the internal jugular, between the longus colli muscle and the scalenus anticus, on the outer side of which it again makes its appearance, as is seen in Pl. II, preserving the same general relations. The common carotid continues to mount by the side of the trachea, continually approaching the vertebral column in its course, covered by the sterno-thyroideus muscle, and sending off no branch of any significance. The subclavian, whilst concealed by the vein and the muscle, sends off several branches of importance to the surgeon, and which we shall take a future opportunity of displaying.

The view now presented is given expressly to show the relative positions of the subclavian and internal jugular veins and superior cava, the situation of which must never be lost sight of for a moment, as upon their escape or injury, in any operation performed in the region represented, depends in a great measure the life or the death of the patient; and more than this, the small branches of veins, which, from the anterior, lateral, and inferior parts of the neck, run to empty themselves into or near the point of confluence of the internal jugular and subclavian, must be carefully studied, and almost as sedulously avoided by the surgeon as the great conduits themselves; for if wounded, they pour out a torrent of black blood, which fills the wound every instant, and they are not always readily to be commanded either by compression or the ligature, which ought always to be looked upon as a last resource in case of hemorrhage from veins, its use being so apt to be followed by uncontrollable inflammation of the vessel tied.

The vena cava superior, formed by the united trunks of the internal jugular and subclavian vein, always lies immediately behind the posterior or clavicular fascicu-

lus of the sterno-mastoid musele. At the point of junction, the internal jugular vein is about half a finger's breadth from the carotid artery; it is only in the upper third of their course that these two vessels lie side by side and in contact.

The nerves which descend along the anterior and lateral parts of the neck to the thorax, passing both in front of the subclavian artery and behind it, must never be forgotten.

OPERATIONS.

LIGATURE OF THE CAROTID BEHIND THE MASTOID MUSCLE.

The chest, in preparing the patient for this operation, must be raised, and the head slightly thrown back and turned to the side opposite that on which the surgeon is about to operate. The surgeon then feels for the inner edge of the sterno-mastoid musele, begins his incision from the level of the thyroid cartilage, and making the muscle his guide, terminates it near the upper part of the sternum. He divides in succession the platysma myoides, the cellular laminae or superficial fasciae of the neck, and relaxes the museles by now bringing the head round till the face looks straight forward. He then separates the edges of the wound, tears with the handle of his scalpel the cellular substance which lies between the inner aspect of the sterno-mastoid musele and the great vessels; pushes up the omo-hyoideus if it be found in his way, and upon a grooved director lays open the cellular sheath common to the artery and vein. He then makes use of the point of the director to separate the vein from the artery, and to isolate this from the nerves which run parallel with it. No difficulty is experienced in passing a ligature under the vessel, and this being tied with a reef knot, and one end cut off, the edges of the wound are brought together, and are readily maintained in contact, with the assistance of the easy position into which the patient must be put when laid in bed, by means of a few strips of sticking plaster.

LIGATURE OF THE SUBCLAVIAN.

This vessel is taken up—1st, on the inner side of the scaleni muscles; 2d, on the outside of these museles; and 3d, whilst actually passing behind the scalenus anticus.

THE OPERATION ON THE INNER SIDE OF THE SCALENI.

The operations hitherto undertaken to secure the subclavian artery in this point of its course have been unsuccessful; the modes of operating have been various. We have been recommended to cut through the clavicular origin of the sterno-mastoid musele, to push the internal jugular vein inwards, and the subclavian downwards and forwards towards the clavicle, then to force aside the nervous trunks with which the artery is in contact, and to pass the ligature under it by means of a suitable needle. Various other methods of reaching this artery have also been imagined; in one the application of the trephine to the sternum forms one of the steps. Wherefore not penetrate through the sterno-mastoid museular interspace, and search for the vessel at the bottom and outer edge of this cavity? Attempted in any way, however, the ligature of the subclavian artery, on the inner side of the scaleni, will always be a very difficult and very dangerous operation.

THE OPERATION BETWEEN THE SCALENI.

The following is the procedure ascribed to the celebrated Dupuytren, and that by which he is said to have secured this vessel several times successfully:—"An incision is carried transversely across the bottom of the neck, from the anterior edge of the trapezius to the outer edge of the sterno-mastoid. The scalenus anticus being attained, the point of a grooved director is slipped betwixt its outer or posterior edge and the artery, and the cellular substance now raised on the point is divided. This brings the vessel completely into view, and isolated. The scalenus posticus serves as a guide to the aneurismal needle, which is now passed under the artery."

THE OPERATION ON THE OUTER SIDE OF, OR BEYOND THE SCALENI.

Various procedures are followed in this operation, which is by no means very difficult. The patient being placed as the subject is represented in Plate II, the integuments are divided transversely at the distance of an inch above the clavicle, from the anterior edge of the trapezius to the outer margin of the sterno-mastoideus. If the external jugular or any other superficial vein be now found lying in the way, if it cannot be drawn suffi-

ciently aside, it had better be secured and divided before advancing farther. The laminæ of condensed cellular substance, which abound in this region, are then cautiously divided, layer by layer, or separated, when possible, with the handle of the scalpel. The outer edge of the scalenus anticus must be discovered, as a guide to the remaining steps of the operation, and instead of searching for the vessel above the clavicle, proceeding from below upwards, let the surgeon expect to find it downwards, and even towards the inferior surface of this bone, a precaution which is really of the highest importance, and which will always prevent him

from tying a branch of the subclavian plexus of nerves instead of the subclavian artery, as has been done.

When the vessel is found, and it is often distinctly felt when it cannot be seen, the finger of the left hand must serve as a guide to the aneurismal needle, which must be passed from before backwards and from below upwards, so as to come out under the brachial plexus and omo-hyoideus. The edges of the wound are readily retained in contact, with a point or two of suture, or a few strips of adhesive plaster, aided by a suitable position of the patient.

PLATE V.

LEFT SUPERIOR, THORACIC, AND INFERIOR CERVICAL REGIONS.

ADULT MALE: NATURAL SIZE.

- A, B. Chin and line of the lower jaw.
- C. Lobe of the ear.
- D. The throat.
- E. Prominence of the mastoid process.
- F, F. Tops of the shoulders.
- G. Anterior edge of the axilla.
- H. Left nipple.
- I. Chest over the sternum.

Bones.

- a, b, c. Portions of the sternum and clavicle, with the edge of the articular cartilage.
- c', c'. Flap of integument thrown over the shoulder.
- d. Transverse section of the clavicle.
- e, e. The ribs divided a few finger-breadths from the sternum.
- d', e', e'. The divided portions turned forwards.
- f, f. The sternum divided vertically.
- g, g'. Longitudinal section of the fourth rib and its cartilage.

Muscles.

- 1, 1. Sterno-hyoideus.
- 2, 2. Thyro-hyoideus.

- 2', 2'. Sterno-thyroideus.
- 3, 3. Omo-hyoideus.
- 4, 4. Sterno-cleido-mastoideus.
- 5, 5. Scalenus posticus.
- 6. Anterior fasciculus of this muscle.
- 7, 7. Scalenus anticus.
- 8, 8. Pectoralis major.
- 9, 9. Pectoralis minor.
- 10, 10. Internal intercostals.
- 11. Subclavius.

Arteries.

- 12. Aorta.
- 13. Arteria innominata.
- 14. Left common carotid.
- 15. Left subclavian.
- 16. Superficial transverse cervical.
- 17. Internal mammary.

Veins.

- 20. Left internal jugular.
- 21. Left subclavian.
- 22, 22. Lateral veins of the neck emptying themselves near the confluence of these two great trunks.
- 23. Branches entering the subclavian.
- 24. Mammary vein tied.

- 25, 25. Inferior thyroid veins.
- 26. Pulmonary artery.
- 27. Remains of the ductus arteriosus.

Nerves.

- 30. Pneumo-gastric.
- 31. Left recurrent.
- 32. Descendens noni.
- 33. One of the roots of the phrenic.
- 34. Trunk of the phrenic.
- 35, 35, 35. Different roots of the brachial plexus.
- 40. Thyroid cartilage.
- 41. Cricoid cartilage.
- 42. Crico-thyroid membrane.
- 43. Thyroid gland.
- 44. Trachea.
- 45. Left division of the bronchi.
- 46. Sternal attachment of the right sterno-cleido-mastoid muscle.
- 47. Supra-sternal fascia raised.
- 48. Pericardium, blending with the cellular substance enveloping the great vessels.
- 49. Bag of the pericardium.
- 50. Anterior surface of the left lung.
- 51. Section of the substance of the same lung.

PLATE VI.

INTERNAL BRACHIAL REGION.

RIGHT ARM OF A MAN OF ORDINARY STATURE: NATURAL SIZE.

The arm is represented stretched out at right angles to the trunk, the fore-arm in supination, and the view extends so much into the axilla, that the posterior edge of this hollow, formed by the outer and inferior margin of the latissimus dorsi muscle, is perceived.

- A. The anterior aspect of the pectoralis major muscle.
 B. The inferior and outer edge of the same muscle.
 C. The hollow of the axilla.
 D. Anterior and inner surface of the scapula, forming the posterior paries of the axilla in this position of the arm.
 E. Inferior angle of the scapula.
 F. Costa or outer edge of the same bone.
 G, G. Posterior and internal region of the arm.
 H. Situation of the olecranon.
 I. Epitrochlea, or internal tuberosity or condyle of the distal end of the humerus.
 K, L. Projection of the muscles of the fore-arm, principally formed by the pronator teres and the palmaris.
 M, M. Section of the skin and subcutaneous adipose substance from the elbow joint nearly to the tip of the shoulder.
 a, a. Adipose cellular tissue filling the hollow of the axilla.
 a'. A lymphatic gland.
 b, c. Tendinous terminations of the teres major and latissimus dorsi muscles.

- d, d. Tendon of the long portion of the triceps extensor cubiti.
 e, e. Passage into the aponeurotic canal of the ulnar nerve formed in the internal intermuscular aponeurosis.
 f, f, g. A portion of the brachial and anti-brachial aponeurosis which has not been dissected away.

Muscles.

- 1, 1. Pectoralis major.
 2, 2. Coraco-brachialis, or perforatus.
 3, 3. Biceps brachialis.
 4, 4. Brachiaëus internus.
 5. Latissimus dorsi.
 6. Teres major.
 7, 7. Long or posterior portion of the triceps.
 8, 8. Short or inner portion of the same muscle.

Arteries.

9. Brachial or humeral artery from its exit in the axilla to the level of the elbow joint.
 10, 10, etc. Various branches of this artery

distributed to the fat of the axilla, the biceps muscle, and long portion of the triceps.

Veins.

11. Basilic.
 12. Median basilic.
 13, 13. Tributaries to the basilic.
 14. Posterior ulnar.
 15. Vein proceeding from the triceps to join the basilic.
 16. Branch of communication between the basilic and one of the humeral veins.
 17. One of the deep humeral veins.

Nerves.

18. External cutaneous, or musculo-cutaneous nerve.
 19, 19. Median.
 20, 20. Internal cutaneous nerve.
 21, 21. Superior division of this nerve.
 22, 22. Another division of the same.
 23, 23. Different ramifications of the internal cutaneous nerve.
 24, 24. Ulnar nerve.
 25. Radial nerve.

OBSERVATIONS.

In this view the basilic vein and internal cutaneous nerve lie on the outside of the brachial aponeurosis, included in a sheath peculiar to themselves; but this membranous expansion invests and includes all the rest of the parts displayed.

The muscles of this region are almost all attached by means of tendons to the bones, and are extremely regular in their distribution. The short head of the triceps

extensor is invariably perforated in the manner represented by the ulnar nerve. The muscles composing the edges of the axilla are seen distinctly, the pectoralis major in front (in this view superiorly), the latissimus dorsi, and teres major behind. The parts included between these muscles near their humeral attachment, are the short head of the biceps and the coraco-brachialis, the five nerves of the arm, the humeral artery, the hu-

meral veins, and the basilic now united into a single trunk, which is about to become and to be entitled axillary. The long head of the biceps is also included within the sheath formed between the pectoralis and teres major.

The coraco-brachialis, biceps, and brachialis internus, are represented as on the stretch; the three portions of the triceps are relaxed, a state which follows necessarily from the position of the extremity.

The vessels always preserve the situation and general direction indicated in the plate. They are nevertheless subject to individual varieties, and occasionally even present anomalies; one of the most frequent of these is the division of the humeral artery into two branches, either as it is issuing from the axilla, or at some point of its course down the arm, instead of bifurcating opposite to or below the bend of the arm. The basilic vein, become axillary, does not always continue to run under the artery, but on the inside of it, and so as to conceal it partially. The artery is itself usually accompanied with two (seldom with more) deep humeral veins, sometimes only with one.

At the point of reunion and attachment of the coraco-brachialis, brachialis internus, and short head of the triceps, the whole of the nerves of the superior extremity pass downwards in a bundle. These are: the *external cutaneous*, *musculo-cutaneous* or *perforans*, the *median*, the *internal cutaneous*, the *ulnar*, and the *radial*. The whole of these trunks and various other smaller ones pass off from the brachial plexus. In the axillary region we shall see how these different nerves surround and enclose the axillary artery within the meshes formed by their anastomoses.

The *external cutaneous*, or *perforating* nerve, proceeds for a short way under the coraco-brachialis, perforates this muscle and makes its appearance on the inner side of the biceps; from thence it descends in front of the brachialis internus, and issuing at length by the outer margin of the bicipital tendon, it becomes superficial.

The median nerve does not give off a single branch of any consequence in the whole of its course down the arm. It always lies above and a little on the inside of the artery. Having reached the bend of the arm, it passes over the vessel and dips under the inner edge of the pronator teres, behind the aponeurotic expansion of the biceps.

The *internal cutaneous* is distributed in a manner sufficiently implied by its name. In the present case it sends off a remarkable branch, which passes down behind

the internal condyloid process or epitrochlea of the humerus, in the groove of the ulnar nerve. The trunk of the nerve is always to be found on the inner side of the two principal vessels of the arm.

The *ulnar* nerve descends along the arm obliquely between the tendons of the latissimus dorsi and teres major and the vessels of the arm; it is then to be found lying inside of the short portion of the triceps, and penetrates the aponeurotic sheath of which mention has been made, and within which it may be traced, till it reaches the internal condyloid process of the humerus, where it is often visible, as in the plate, from a deficiency in the aponeurosis at this point.

The *radial* nerve is the one which is the least seen of any part in this region. It descends along the inner side of the os humeri, passes between the long and short portion of the triceps, behind the humerus, around which it winds in a spiral, and then, lying deeply between the brachialis internus and the supinator longus, it advances on its course down the fore-arm.

OPERATIONS.

There is perhaps no artery in the body which the surgeon is called upon more frequently to tie than the brachial. The course of the vessel is very accurately indicated by an oblique line carried from the hollow of the axilla to the middle of the bend of the arm. When it is deemed necessary to tie it, therefore, the arm being placed in supination, the surgeon feels along the inner margin of the biceps muscle, and makes an incision from two and a half to three inches in length, through the common integuments, in the course of the line indicated. The forefinger of the left hand is immediately passed into the wound, and the median nerve is commonly felt at once like a firm round cord. Immediately under and to the inside of this nerve lies the artery, which, being distinguished by its pulsations, is reached by dividing one after another the fibrous layer of cellular membrane that lie above it. The sheath of the vessels being attained, is opened; and the artery, isolated from the veins which surround it with the point of a grooved director, has the ligature passed round it. This operation is in general easily and quickly performed. The dressing should be of the lightest kind, a single strip of sticking plaster, sufficing to keep the edges of the wound together, and this with a suitable position of the extremity, generally securing union by the first intention in every point save that through which the ligature passes.

PLATE VII.

THE BEND OF THE ARM.

THE RIGHT EXTREMITY—ADULT—NATURAL SIZE.

A. Point of insertion of the deltoid. B, Outer, and C, inner side of the arm. D, E, Outer, and F, G, inner side of the fore-arm. H. Epitrochlea, or internal condyloid process of the os humeri. a, b, c, d. Section of the integument.	i. Branch of communication. k. Median cephalic. l. Median basilic. m. Cephalic. n. Basilic. o. Cutaneous or small basilic.	<i>Aponeuroses.</i> I, K. Brachial aponeurosis in front of the biceps. L. The same aponeurosis covering the muscles of the outer and anterior region of the fore-arm. M, N, O. The same aponeurosis in front of the pronator teres, palmaris longus, and flexor carpi ulnaris. P. Tendon of the biceps. Q, Q. Expansion of a slip of this tendon, strengthening the aponeurosis of the inner aspect of the fore-arm.
<i>Veins.</i> f, f. Anterior cubitals, or basilics of the fore-arm. g, g. Posterior cubital veins. h, h. Common median.	<i>Nerves.</i> p, p. Internal cutaneous. q, q. Principal divisions of this nerve. r, r. External cutaneous, or perforans. s, s, s. Principal divisions of this nerve.	

OBSERVATIONS.

THERE are two aponeurotic layers covering the region about the bend of the fore-arm. One of these is immediately subcutaneous, and lies on the outside of the veins, nerves, etc. represented in our plate. It is thin, and furnished with but a single order of fibres; still it is glistening and easily demonstrated. The other, lying underneath the subcutaneous veins and nerves, is the aponeurosis properly so called. This is a very strong, fibrous sheath, of a white colour and glistening aspect, composed of distinct orders of interlacing fibres, pierced with a few holes here and there, and calculated to envelop, to contain, and to divide the muscles of the extremity, whilst it supports each of them in their several actions. It is not everywhere of the same strength. The tendon of the biceps, and the aponeurotic slip (Q) sent off from it deserve particular attention, as it is always behind this, in front of the brachii internus, between the inner or ulnar edge of the biceps, or rather of its tendon, and the outer or ulnar margin of the pronator teres that the brachial artery and the median nerve are found, and it is in this situation that the brachial artery is so frequently wounded by the ignorant or unskilful phlebotomist.

The superficial veins of the arm are sometimes small and few in number, the blood being principally returned from the hand and fore-arm by the deeper vessels. Sometimes they lie under so thick a layer of adipose membrane as not to be distinguishable. In other cases again they are extremely prominent, knotty, and almost varicose in appearance. The veins of the bend of the fore-arm arise in the following manner: the roots or tributaries of the *basilic* come from the inner, anterior, and posterior parts of the ulnar half of the fore-arm and wrist. The *cephalic* collects the blood of the anterior, external, and posterior or radial half of the fore-arm. The *common median*, which arises on the front of the fore-arm, generally discharges itself into the *communicating* branch, and it is from the *common median* and the *communicans* that the median cephalic and basilic take their origin. The cephalic runs superficially upwards between the deltoid and the pectoralis major, as the superior separation of these two muscles; it then usually dips under the clavicle (it very rarely happens that it passes over it, though this does occur, and it sometimes bifurcates and passes both under and over this bone), and empties itself into one of the posterior

clavicular veins, or into the internal jugular vein near its junction with the subclavian. The basilic again ascends within its sheath to the level of the axilla, where it is joined by the humeral vein, the cutaneous basilic, etc., which together constitute the axillary vein.

Little needs be said in regard to the distribution of the two cutaneous nerves, which can be appreciated better at a glance of the eye than explained in any description.

The superficial arteries of the bend of the arm are altogether insignificant.

The aponeurotic envelope of the arm is insensible in the healthy state, like all the rest of the fibrous tissues. The accidents, occurring after bleeding in the bend of the arm, so long ascribed to a puncture of this sheath,

are now known to depend on a very different cause,—on injury of one of the accompanying branches of nerves, and still more frequently on inflammation of the vein which was opened. The aponeurosis itself is very little subject to disease. It is much exposed to injury, however, particularly to wounds; a suitable position is then a great means of accomplishing a speedy and effectual cure.

Inflammation of the vein is the most serious of all the accidents which follow bleeding. Neglect of proper precautions after the operation, and the use of a blunt or dirty lancet may occasionally be ascribed as the cause of this unfortunate event; but it sometimes supervenes in spite of every attention, and though the sharpest and most polished instrument has been made use of.

PLATE VIII.

THE BEND OF THE RIGHT ARM: NATURAL SIZE.

The veins of the bend of the arm are subject to extreme irregularity. The distribution figured in the plate is that which is generally indicated as the one which should be considered as typical and standard.

A. The situation of the deltoid.

A', A'. Outline of the triceps.

A''. Inferior or inner aspect of the arm.

B. Great basilic, or basilic vein of the arm.

D. Upper or external aspect of the arm.

E. Epitrochlea, or internal condyloid process of the humerus. The epicondyle is in the direction of F. The line of flexure of the elbow joint consequently extends between E and F.

G, G. Radial or outer edge of the fore-arm.

H. Ulnar or inner edge of the same.

I. Bicipital prominence.

K. External or radial muscular prominence of the fore-arm.

L, L. Muscular mass of the ulnar aspect of the same.

M, N, O, P. Bleeding fillet or bandage applied.

Veins.

c, c. Cephalic of the fore-arm.

m c. Median or common median of the fore-arm.

c m. Median cephalic.

b m. Median basilic.

b, b, b. Tributaries to the basilic.

e, p. Posterior ulnar, also running to the basilic.

a, a, a. Anastomosing branches.

i. Vena innominata.

OBSERVATIONS.

THE bend of the arm is the place usually selected for the performance of venesection, one of the most common as well as one of the nicest operations of surgery. The instrument now universally employed in this important

operation is the common lancet, which is better when made somewhat broad all the way from the point to the shoulder, than when fashioned with a long slender tapering point. Any of the larger veins about the bend

of the arm may be selected for bleeding by the experienced operator. The younger practitioner, the midwife, and others with less knowledge of the relative situation of the important parts about the bend of the arm, can never do serious mischief by selecting a vein on the radial or thumb side of the tendon of the biceps muscle, the cephalic of the fore-arm (c), the cephalic of the arm (C), and the median cephalic (c m), may be punctured in all safety. The basilic veins which creep along the inner edge of the fore-arm, may also be safely opened. The common median too may be selected without risk, although it is not generally preferred.

Of all the veins, the basilic (B) and median basilic (m b) are those which must be avoided most carefully, both from the near vicinity of the humeral artery and of the median nerve.

The bandage being applied with due lightness, i. e. the superficial veins of the arm being turgid, whilst the pulse is still distinctly felt at the wrist, the surgeon grasps the back of the arm with the fingers of his left hand, and uses his thumb in front to fix the vein which he proposes opening; the lancet then, held easily between the forefinger and the thumb of the right hand, is pushed steadily parallel, or in a slight degree obliquely,

to the course of the vessel until it is felt to enter its cavity. The blood immediately rises by the sides of the instrument, and this being withdrawn, the stream follows it, and is received into a vessel of known or previously ascertained capacity.

The requisite quantity of blood being abstracted, the surgeon places the thumb of his left hand upon the bleeding orifice, and with his right draws the slip-knot of the bandage, which is immediately relaxed. The arm is then washed with a little tepid water, and having a small pad of lint or soft rag in readiness, he applies it by the side of his thumb, and removing this gradually, and approximating the edges of the little wound, he presses the compress steadily over the orifice, and secures it with a few turns of a narrow cotton roller.

A considerable degree of pain is sometimes felt at the moment of puncturing the vein, or very shortly afterwards. This usually subsides before long; if it continues for any time, a local tepid bath, or an emollient poultice will often give relief; an opiate, if the state of the patient admits of the prescription, is another good means of allaying the pain.

PLATE IX.

ANTIBRACHIAL REGION.

ADULT—NATURAL SIZE.

- A. Anterior aspect of the arm.
 B. Anterior aspect of the fore-arm, near the wrist.
 C. Outer or radial edge of the fore-arm.
 D. Inner or ulnar edge of the same.
 E. Internal condyloid process of the humerus, or epitrochlea.
 a, b, c. Section of the skin.
 d. Flap of integument.
 e, e. Aponeurosis of the fore-arm.
 f. Aponeurotic expansion of the tendon of the biceps.
 g. This expansion descending over the muscles about the epitrochlea.
 h, h. Transverse partition of the aponeurosis, dividing the deeper from the more superficial muscles of the fore-arm.

Muscles.

1. Lower end of the biceps.
 2. Tendon of the same muscle.
 3, 3. Part of the anterior surface of the brachii internus.
 4, 4. Anterior surface of the supinator longus.
 5, 5, etc. Anterior aspect of the pronator teres.
 6, 6, etc. Flexor carpi radialis.
 7, 7. Belly of the palmaris longus.

8. Flexor carpi ulnaris.
 10, 11, 12. Parts of the flexor communis sublimis digitorum.

Tendons.

- 1', 2'. Tendons of the extensor brevis and abductor longus pollicis.
 3', 4. Tendons of the extensor carpi radialis longior and of the supinator longus.
 5', 5'. Tendon of the flexor carpi radialis.
 6', 6'. Tendon of the palmaris longus.
 7', 7', 8', 8'. Tendons of a portion of the flexor communis sublimis, and of the flexor carpi ulnaris.

Arteries.

- 13'. Branch of an artery running to the pronator longus.
 13, 13. Brachial artery.
 14. Radial artery.
 14'. Branch distributed to the pronator teres.
 15. Ulnar artery.
 16. Radial artery above the wrist.
 17. Ulnar artery in the same situation.

Veins.

- 20, 20. Roots of the median vein of the fore-arm.

- 21, 21. Median of the fore-arm.
 22. Anterior ulnar or basilic veins of the fore-arm.
 23, 24, 25. Superficial veins of the ulnar aspect of the fore-arm.
 26. Posterior ulnar veins.
 27. A branch connecting the anterior and posterior ulnar veins, and running to form—
 28. The basilic vein of the arm.
 C', C', C'. Anastomosing branches of the superficial veins.
 29. Median basilic vein.
 30. Median cephalic.
 31. A branch not usually met with, proceeding from the posterior part of the bend of the arm.
 32. Cephalic vein.
 33, 33. Deep radial vein.
 33, 33. Deep humeral veins.

Nerves.

- 40, 40, etc. Principal divisions of the internal cutaneous nerve.
 41, 41. External cutaneous nerve.
 42. Median nerve.
 43. Exterior divisions of the anterior branch of the radial nerve.

OPERATIONS.

No arteries in the body are so much exposed to be wounded as those of the palm of the hand. The hemorrhage, in an event of this kind, is frequently alarming, and compression often proves unavailing as a means of stopping it. It is very seldom found practicable to put a ligature upon the bleeding vessel, although this has been done by seizing the open mouth at the bottom of the accidental wound. The parts in the palm are by far too intricate and important, to admit of incisions of sufficient extent being made there to discover the bleeding vessel, and the surgeon has then nothing for it but to cut down upon the radial or ulnar artery, and by

securing one or other or both of these with a ligature to intercept the current of blood, and afford time for the formation of a coagulum and the obliteration of the wounded vessel.

The radial artery in the lower third, or rather half of its course, runs in the groove formed between the tendons of the flexor carpi radialis and supinator longus, covered by the common integument, the superficial fascia, and the proper fascia of the fore-arm; over the lower end of the radius, the vessel is almost naked; it is accompanied closely by one or more veins; the radial nerve is at some short distance to the outside of it.

The entire course of the vessel is indicated by a line drawn from the middle of the bend of the arm to the styloid process of the radius. The ulnar artery, near the wrist, lies somewhat deeper than the radial, and is not made the subject of surgical operations higher than about from the fourth to the third of its course, when it is found lying upon the flexor profundus and running between the tendons of the flexor sublimis and flexor carpi ulnaris. The vein by which the artery is usually accompanied is on the radial or outer, the nerve on the ulnar or inner side of the vessel. An aponeurotic sheath, the fleshy fibres or the tendon of the ulnar flexor, another fibrous fascia, and a quantity of adipose and cellular substance lie between the vessel and the skin. The course of its two inferior thirds is pretty accurately indicated by a line extended from the inner condyle of the humerus to the radial side of the os pisiforme. Both of these arteries however are distributed in very different ways, and these anomalies of formation must never for a moment be lost sight of by the surgeon when he is about to undertake any operation upon the fore-arm.

To tie the radial artery above the wrist, the hand must be placed supine. The surgeon then makes an incision through the skin with an ordinary scalpel, from an inch and a half to two inches in length, in the direction of the artery. The sheath is then to be punctured, and, a grooved director being passed beneath it, to be divided. The vessel then comes into sight and is easily raised from the inside upon an ordinary aneurismal needle. When the ulnar is the vessel to be tied, the hand and fore-arm are placed as before; the incision is also of the same extent as in the operation last described, and must not go deeper in the first instance than the fascia, which being incised in the same manner, the tendon of the ulnar flexor comes into view, and this being pushed aside outwardly, the artery is discovered lying under a second aponeurotic lamina, on the radial or outer side and a little in front of the ulnar nerve. The fascia is divided on the director, and the vessel, being loosened as little as possible from its surrounding attachments, is secured.

The ligature of the humeral artery in the bend of the arm is an operation that is not now very often performed, or one the success of which should encourage

several recent attempts that have been made to revive it. As there do occur circumstances, however, in which it might be deemed advisable to tie this vessel in the situation indicated, the following brief notice of the mode of proceeding in the operation will not be misplaced here.

The arm is placed in complete supination, and firmly secured by assistants. An incision three inches long is carried from below upwards or from above downwards, parallel with the radial edge of the pronator teres muscle, commencing at the distance of about an inch above the level of the internal condyloid process of the humerus, and terminating in the middle of the bend of the arm. Immediately under the skin are encountered the superficial veins, especially the median basilic, and the branches of the cutaneous nerve which accompany it. These must be kept aside by an assistant with a blunt hook or spatula. The branches that cannot thus be drawn out of the way must be secured between two ligatures, if of any magnitude, and divided, or if small they may be cut through and trusted under the fingers of an assistant. The general investing aponeurosis is now displayed, and must be divided in the direction of the external incision upon a grooved canula: it is by no means necessary to spare the aponeurotic slip of the tendon of the biceps which comes in the way at this step of the operation. The artery is now readily distinguished, closely accompanied by the median nerve and one or more deep venous trunks, which lie on the inside and underneath it, and being isolated from these parts with the point of the director, the armed aneurismal needle is passed under it, and the ligature being afterwards tightened, the current of blood to the fore-arm and hand is temporarily interrupted in a great degree. The dressings should be as simple as possible; if any venous branches have been divided, it may be necessary to use slight compression to prevent them from bleeding. If the operation have been successfully achieved without implicating any vein, a single strip of sticking plaster and an easy position of the arm will permit the edges of the wound to be brought into immediate contact, so as to afford a great chance of their union by first intention.

PLATE X.

(PATHOLOGICAL)

THE HAND OF A SUBJECT WHO DIED OF TUBERCULAR PHTHISIS,

CONTRASTED WITH THE FINELY FORMED HAND OF A HEALTHY WOMAN.

HIPPOCRATES remarked that the nails or fingers of the phthisical or consumptive were in some sort hooked. This observation has been lately brought under the notice of the profession, and as the subject is curious, this plate is given with a view to illustrate a form of finger which is common among persons who die of tubercular phthisis.

A is the hand of a female, beautifully formed and in the enjoyment of good health.

B is the hand of a woman who died of tubercular phthisis in the Hôtel Dieu.

C is the index or forefinger of the healthy female exhibited in profile.

D is the forefinger of the phthisical subject represented in the same point of view.

In the present state of information upon this point, it would be rash to conclude that every one who had this peculiar form of hand was consumptive, or to say that every consumptive individual had the form of hand represented. It has nevertheless been found in a great many subjects actually labouring under phthisis, or who have died of this disease.

PLATE XI.**FOETUS IN THE SIXTH MONTH,**

WITHIN THE CAVITY OF THE UTERUS.

A, A, G, B. The right and left haunches.

C. The second lumbar vertebra.

E. Pubes.

F, F. The labia majora.

G. The vulva.

H, H. Fronts of the thighs.

a, a, a. Peritoneum, lining the posterior aspect of the anterior abdominal parietes.

b, b, b. Posterior aspect of the recti abdominis muscles.

b', b'. The epigastric arteries covered by the peritoneum.

c, c, c. Exterior outline of the gravid uterus.

e, e, e. Section of the anterior parietes of the uterus.

f, f. Part of the uterus turned down.

g, g. The round ligaments of the uterus.

h, h. The fallopian tubes.

I. Venous sinus of the ligamentum latum.

K, K. The ovaries.

m, m. Fimbriated edges of the fallopian tubes.

o, o, o. Membranes of the fœtus.

p, p. Another fœtal membrane.

q, q. A third fœtal membrane.

s. The head of the fœtus.

t. The right shoulder.

u. The right hand of the fœtus appearing to grasp the umbilical cord, v.

x, x, y. Whitish deposit upon the shoulder and neck of the fœtus.

PLATE XII.

SUPERFICIAL INGUINAL REGION.

ADULT: RIGHT SIDE—NATURAL SIZE.

- A, B. Skin of the umbilical region.
 C. Umbilicus.
 D, D. Course of the linea alba.
 E. Pubis.
 F. Penis.
 G. Scrotum.
 H, I. Upper part of the thigh.
 a, a, a. Line of section of the integuments.
 b, b, b. Subcutaneous adipose tissue.
 b', b'. This tissue turned back.
 c. Prominence of the anterior superior spinous process of the os ilium.
 d, d, d. Poupart's ligament.
 e. Spine of the os pubis.
 f, f. Inferior or external pillar of the inguinal ring.
 g, g, g. Superior or internal pillar of the inguinal ring.
 h, h. Fibrous slip sustaining or bracing the external pillar of the ring.
 i. Aponeurotic fibres connected with the external pillar.
 k. Origin of the pyramidalis muscle.
 l, l. Aponeurosis or tendon of the external oblique.
 m. The fleshy fibres of the same muscle.
 n. Superficial cellular lamina which succeeds the ligament of Poupart, and extends down upon the forepart of the thigh.
 o, o, o. The same lamina in front of the adductor and pectinaeus muscles.
 p, p. Portion of the fascia lata femoris.
 1, 2, 3, 4. Superficial lymphatic glands of the groin.
 7. Superficial external pudic artery.
 7', 7'. Branches of this vessel.
 8. Tegumentary artery of the abdomen.
 8', 8'. Its subdivisions.
 9, 9, 9'. Arterial twigs of various origin.
 12. Tegumentary vein of the abdomen.
 13. Vena saphena of the thigh.
 14. Trunk of this vessel after it has received the tegumentary branch.
 15. Supernumerary saphena, receiving—
 16. One of the tegumentary branches.
 17. Trunk which results and empties itself into the femoral vein.
 18. Branch of a nerve passing through the inguinal ring.
 19, 19, 19. Superficial femoral nervous twigs.

PLATE XIII.

THE DEEP INGUINAL REGION.

- A. Right side of the abdomen.
 B. Umbilicus.
 C. Linea alba.
 D. Pubes.
 E. Penis.
 F. Scrotum.
 G, H, I. The inner side, front, and outer side of the thigh.
 K. The prominence of the trochanter.
 L. The external iliac fossa.
 L'. Prominence of the crista ilii.
 M. The flank.
 N. Anterior and superior spinous process of the ilium.
 O, O, P, P. Fascia lata femoris, over different muscles.
 a, b, c, d, etc. and i, k, l, etc. Cut edge of the skin and subcutaneous adipose tissue.
 q, q. The adipose layer turned a little back.
 q', q', q'. The fascia superficialis dissected off.
 r, s, s, s. The anterior part of Poupart's ligament.
 t. The spermatic cord.
 u, u. Portions of the crural septum.
 v, v, v. Aponeurotic girdle or arch embracing the femoral vessels above the vena saphena.
 x, x, etc. Deep lymphatic glands of the groin.
 5, 5. Obturator (anomalous distribution).
 6. Circumflexa ilii.
 7. Trunk of the tegumentary artery of the abdomen.
 8 and 9. Femoral twigs.
 10, 10. Abdominal subdivisions of the same.
 11. External and superficial pudic.
Veins.
 12. Femoral.
 13. Epigastric.
 14. Common trunk of the saphena and abdominal cutaneous.
Nerves.
 18. Crural.
 17, 19, 20, 20. Superficial branches.

PLATE XIV.

(PATHOLOGICAL)

FEMORAL AND INGUINAL HERNIA.

RIGHT SIDE—NATURAL SIZE.

In this first view of Hernia, the parts are represented as nearly as possible in their natural position. The only part, in fact, which has been disturbed is the small omental hernia of the inguinal canal.

- | | | |
|--|--|---|
| A. Upper part of the right haunch. | a, b, b, b, c. Oblique curved line indicating the course of the crural arch. | in order that the inferior or external pillar of the ring may be seen. |
| B. Right side of the abdomen. | a. Anterior and superior spinous process of the ilium. | e, e, e. A femoral intestinal hernia, still contained within the peritoneal sac. |
| C. Seat of the umbilicus. | c. Spinous process of the os pubis. | f, f, f. A layer of fatty tissue interspersed with lymphatic glands upon which the hernial tumour lies immediately, or which perhaps it has thrust downwards. |
| D, E. Linea alba. | d, d. A piece of the omentum covered with the peritoneum, which has formed a hernia through the inguinal ring, raised and held up with a pin stuck through it, | |
| F. Penis denuded of its skin. | | |
| G. Spermatic cord. | | |
| H, I, K, L. The right thigh. | | |
| M, N, O. Fascia lata femoris. | | |
| P. The same fascia covering the pectinæus and adductor medius. | | |

OBSERVATIONS.

No very long time has elapsed since surgeons learned to distinguish between *inguinal* and *femoral* hernia. Every tumor of a hernial nature situated in the groin was designated by the vague title of *bubonocoele*. Verheyen, who wrote in the earlier part of the 18th century, was the first who pointed out the fact that

every hernia of the groin did not protrude by the same opening. The recent admirable works of Sandifort, Searpa, and Cooper, on the anatomy especially, and the valuable contributions of Cloquet to the pathology of hernia, leave little for posterity to accomplish in this walk of anatomico-chirurgical science.

PLATE XV.

(PATHOLOGICAL)

FEMORAL HERNIA; THE SAC LAID OPEN.

This Plate is a repetition of the one which precedes it, save that here the parts covering the intestine and neck of the Hernia have been slit open and turned back, to exhibit the relative position of the organs contained in the tumour. The incision extends upwards several finger-breadths above Poupart's ligament.

The whole of the capital letters and the italics *a, b, c*, refer to the same parts as in last plate.

d, d, d, d. The smooth and polished membrane forming the interior of the hernial sac, and evidently continuous with the peritoneal lining of the abdominal cavity.

e, e, e. Noose of the small intestine, which forms the hernia.

f, f. Part of the omentum.

g, h. Epigastric vein and artery.

OPERATION FOR STRANGULATED FEMORAL HERNIA.

AFTER every measure which good surgery warrants has been exhausted in attempting to effect the reduction of a strangulated femoral hernia, but in vain, the operation for the relief of the parts must be undertaken immediately. This operation consists of the following steps: The division of the integuments; the division of the layers of condensed cellular substance and adipose tissue which lie between the skin and the hernial sac; the incision of this sac; the division of the structures causing the strangulation of the parts contained in the tumour; and the return of these into the cavity of the abdomen.

Surgeons are not perfectly agreed as to what is the best direction and necessary extent of the first incision. A good deal must depend, especially as far as the latter point is concerned, on the size of the hernia. Sir Astley Cooper recommends the integuments to be divided in the form of a reversed capital T, thus J, the incision which represents the shank of the letter commencing at the distance of about a finger's breadth above the crural arch, and descending at right angles to this as low as the centre of the tumour. The cross of the reversed T is consequently parallel to the crural arch, and the angular flaps are dissected upwards and inwards on the one hand, upwards and outwards on the other.

Sabatier expresses himself in favour of a simple incision, the direction of which is made to correspond with that of the long diameter of the hernia. Boyer is also of opinion that a simple straight incision is enough, unless in cases where the hernia is excessively voluminous. Dupuytren was in the habit of operating both with a simple vertical and with a crucial incision. Velpeau says that the first incision ought almost always to be carried parallel to the line of flexion of the groin, and of the long diameter of the tumour at the same time, and that it may generally be simple; opinions in which we perfectly agree.

The first incision exposes the superficial fascia, which from the crural arch descends over the upper and inner part of the thigh. A quantity of fatty tissue, more or less, is encountered under the superficial fascia, which being divided cautiously, the *fascia propria* of the tumour, investing the peritoneum or hernial sac immediately, is next attained. Ramifying through this adipose substance a number of small veins,—branches of the tegumentaries of the abdomen, of the superficial pudics, etc. and a few unimportant arterial twigs, are liable to be divided; these generally give no trouble; every one that bleeds, however, is immediately to be tied. The vena saphena can never be endangered, for it invariably

lies under and behind the hernia. The whole of the parts are to be divided very slowly and deliberately, nothing being cut that is not either distinctly seen or accurately felt.

The hernial sac attained, the next step of the operation consists in laying it open, the greatest care being taken not to wound the intestine or other parts which it may include. To lay open the hernial sac, we have been recommended to pinch up a little piece of it between the thumb and forefinger, and to divide this; or to seize it very delicately with a pair of dissecting forceps, to pull it away from its contents, and then to make the smallest possible puncture, through which a grooved director being passed, the sac is readily and without risk of injury slit open from the bottom to the neck.

The operation thus far advanced, it is in some cases possible to return the contents of the hernia into the cavity of the abdomen without doing more; that is to say, without dividing the parts which have occasioned all the mischiefs of strangulation. There is, however, a certain risk then incurred of returning the noose of intestine, or epiploon unrelieved from strangulation, as the neck of the sac is itself occasionally the seat of the stricture, and this is apt to slip back at the same instant as the hernia, when of course all the unfavourable symptoms continue and the end of the case is fatal. It is therefore generally imprudent to attempt to return the contents of the hernial tumour without having first examined the state of the parts contained within the inguinal canal, and above all those which have been immediately subjected to the pressure of the falciform margin of the fascia lata or the sharp concave edge of Gimbernat's ligament, the usual seats of the stricture. This is the spot in which ulceration is known to occur most frequently, and that too in which the intestine is oftenest found disorganised and perforated. Everything like an approach to violence must of course be carefully avoided, should the attempt to return the contents of the hernia be decided on as warrantable. To say the truth, it very rarely succeeds; and the motive for urging it, the risk, to wit, of wounding blood-vessels in dividing the stricture, is much greater in presumption than it has been found to be in practice.

Various methods of dividing the stricture in femoral hernia have been particularly recommended as well as successfully practised. On the outer side of the neck of the sac we have the epigastric artery; above it, the spermatic cord; and on the inner side, the obturator artery when it arises from the epigastric as it frequently

does. In looking over the results of a great number of operations undertaken for the relief of strangulated femoral hernia, we do not find, however, that the epigastric, obturator, or spermatic arteries have been implicated, save in a very few and even doubtful instances, and that different eminent surgeons have divided the stricture outwards, upwards, and inwards, with nearly similar success. Were any of the vessels endangered to be actually wounded, no great difficulty would probably be experienced by surgeons now-a-days in securing them with a ligature, or by compression in arresting every thing like serious hemorrhage from their orifices. By using a knife with a *smooth round edge*, moreover, as M. Lisfranc first showed, tendinous and aponeurotic parts upon the stretch are readily divided, whilst loose cellular membrane, blood-vessels, etc. are merely pushed before it. As a general rule, the stricture of femoral hernia may be divided directly upwards without risk of wounding the spermatic vessels which do not run along the edge of the internal oblique, but among its fibres and several lines higher. The whole of the portion of the external oblique which goes to form the external pillar of the inguinal ring, has even been divided directly upwards and still the spermatic vessels have escaped injury. Instead of making a single incision of such extent as shall be necessary to liberate the strangulated contents of the hernia, in any one direction, it has been proposed to make several smaller ones at different points of the constricting ring; and this procedure would appear free from all serious objections.

The stricture in femoral hernia is almost invariably caused by the edge of the falciform process of the fascia lata, and still more by the sharp sickle-like margin of the ligament of Gimbernat, though in some cases the neck of the sac, as has been said, seems to have fully as large a share in the mischief as any of the component parts in the femoral ring. These are the parts consequently by the division of which the stricture will be most immediately abated. In dividing the stricture the point of the finger will generally be found to make the best director. The instrument used for the purpose should be a straight *probe pointed* and somewhat *blunt*, rather than very sharp, bistory.

The hernial sac once laid fairly open, the state of the viscera included within it must be the next subject of attention to the surgeon. When the tumour is small, the different folds of intestine often appear agglutinated together by the deposition of soft cogulable lymph. These slight adhesions are readily destroyed with the

point of the finger. Should adhesions of longer standing and firmer texture, in the shape of membranous bands, be discovered, they may be divided with the knife or snipped with scissors. The most unfortunate of all occurrences of this kind is when the entire surface of the noose of extruded intestine is found adhering intimately to the inner aspect of the sac. Adhesions of this kind are by no means to be meddled with. All the surgeon can then venture to do is to divide the stricture freely, and replacing the integuments so as to cover as much of the hernial tumour as possible, to leave the event to nature. And this practice is warranted not only by the necessity of the circumstances, but even by the fortunate event in numerous instances; for after the removal of the obstacle to the free passage of the blood to and from the intestine, and of the fæcal matters within it, the symptoms of strangulation often rapidly subside, and in the course of time the tumour diminishes in bulk and is gradually resumed into the cavity of the abdomen.

Adhesion to this extent, however, is a rare occurrence, and the state of the viscera extruded, presenting nothing particularly unfavourable in their appearance, —no ulcer of considerable depth, nor gangrenous spot, nor contraction of the calibre of the intestine in the point immediately constricted appearing, (and this, by the way, is a portion of the hernia which must always be particularly examined,) the surgeon has now to return the contents of the tumour into the cavity of the abdomen.

The dressings should be of the lightest and simplest kind. Two or three strips of sticking plaster will keep the edges of the wound either in opposition, or near each other, according to circumstances and the indication to be fulfilled. A favourable position is of itself one great means of keeping every thing in its place, and should not be neglected. The patient must be kept upon slops; and emollient glisters will generally be found much better means of making the bowels act than irritating purgatives administered by the mouth.

PLATE XVI.

INGUINAL HERNIA OF THE LEFT SIDE.

NATURAL SIZE.

- | | | |
|---|---|---|
| A. Prominence of the left haunch. | anterior superior spinous process of the ilium; and c, the spine of the os pubis, the two extremities of this arch. | g. Several concentric folds forming this cellular lamina. |
| B. Left side of the abdomen. | d. Ligamentum suspensorium penis. | h. The point of the omental mass contained within the inguinal canal, and about to pass the inferior orifice of this passage. |
| C. Seat of the umbilicus. | e, e, e. Anterior superior pillar of the inguinal ring. | i, i, i. A layer of adipose cellular tissue in front of the femoral vessels. |
| D, E. Linea alba. | f, f, f. Condensed cellular layer, passing from one side to the other of the inguinal ring distended by a mass of extruded omentum. | |
| F. The penis. | | |
| G, G. The spermatic cord. | | |
| H, I, K, L. The left thigh. | | |
| M, N, O, P. Fascia lata femoris. | | |
| a, b, b, b, c. Curved line indicating the sweep of the left crural arch; a, the | | |

We shall take another favourable opportunity of the parts contained within strangulated inguinal discussing the operation required for the relief of hernia.

PLATE XVII.

SUPERFICIAL POPLITEAL REGION.

ADULT—RIGHT SIDE—NATURAL SIZE.

A, B, C. Lower part of the thigh.
 D, E, F. Upper part of the calf of the leg.
 G. The projection of the inner condyle of the femur.
 H. Situation of the external condyle.
 a, b, c, d, e, f, g, h. Cut edge of the integument covering the popliteal region.
 i, k, l, m, n, o. Investing aponeurosis of the region.
 Between the common integument and this aponeurosis a layer of fat is seen of varying thickness in different situations.

Muscles.

1, 1, 1. Biceps femoris.
 2, 2, 2. Semitendinosus.
 3, 3, 3. Semimembranosus.

3', 3. Ligamentous or aponeurotic expansion arising from the tendon of this muscle, spread over the posterior aspect of the knee joint.
 4, 4, 4. Gracilis or rectus internus.
 4', 4'. Outer and posterior angle of the inner condyle of the femur, the projection of which appears to separate the semitendinosus and gracilis.
 5, 5, 5. Part of the sartorius.
 6, 6, 6. Heads of the gastrocnemii.
 7. Plantaris.

Veins.

8, 8. Vena innominata, constant in its situation, and inosculating with the popliteal veins.

9, 9. Other venous branches, running towards the popliteal.
 10, 10, 10, 10. Two superficial popliteal veins. These two veins and the internal popliteal nerve here conceal the great popliteal vein.

Arteries.

12, 12. Trunk of the popliteal artery.
 13, 13, etc. Arterial twigs.

Nerves.

15. Sciatic.
 16, 16. External popliteal.
 17, 17. Internal popliteal.
 18, 18, 18. Nervous twigs distributed superficially.

PLATE XVIII.

CONSEQUENCES OF BURNS.

FIG. I. — Deformity in the arm of a child five years old, in consequence of a burn which implicated the entire thickness of the integuments from the axilla to the back of the hand and point of the little finger, passing over the elbow joint and ulnar

aspect of the extremity. 1, 1, 2, 2, 3, 3, indicate the hard and puckered cicatrice or series of cicatrices that occasion the deformity.

FIG. II.—The same arm after the operation which was performed to remedy the deformity.

OPERATION.

The steps of this operation were simply as follow:

With a scalpel, the thickened and contracted cicatrice which bound the fore-arm to the arm was divided perpendicularly. In the middle this new formation was nearly an inch in thickness. Across the top of this incision another was carried at right angles to it, and passing the limits of the cicatrice on either side; by these

incisions the elbow joint was set at liberty. The same was done in regard to the band that confined the wrist joint, after which the hand was readily brought into its natural position. A very small quantity of blood only was lost. The extremity was now placed in a state of complete extension, and confined in this position by means of a couple of splints and a few turns of a roller;

the hand was even brought slightly into adduction and flexion, being maintained in this position by a pad properly disposed between it and the palmar splint. The treatment was continued during three months, care being taken from time to time to make the patient move the several articulations confined, and to perform all the variety of motions of which the upper extremity is susceptible.

The wounds healed with extreme slowness. In five months, however, the lower wound had completely cicatrised, and the upper one was no larger than a shilling, when a greyish looking pseudo-membranous patch appeared on its surface, and the sore was attacked with hospital gangrene. By this untoward event not

only did the wound over the elbow return to its original dimensions, but the one over the wrist, which had been skin-whole, opened afresh and also became as large as ever. Luckily the general health was not affected, and under the use of the concentrated acetic acid principally, the wounds assumed a healthy and healing appearance; but four months more elapsed before these could be brought by unremitting attention to cicatrise. This however was at length happily accomplished; and at the present time (thirteen months since the operation was performed) the arm is occasionally freed from the splint for several hours in succession, and all the motions are performed with perfect freedom.

(Case related by M. A. Bérard.)





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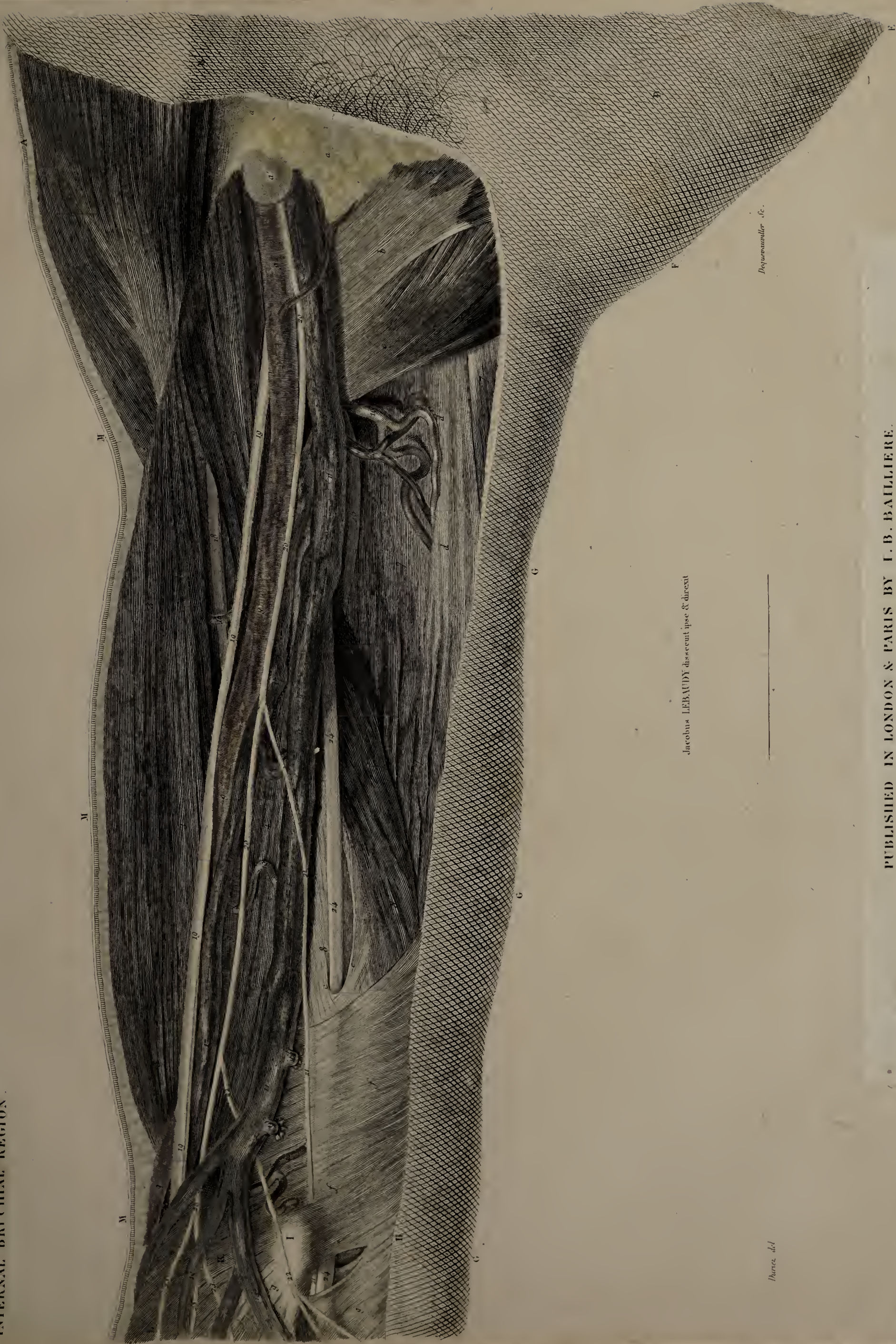
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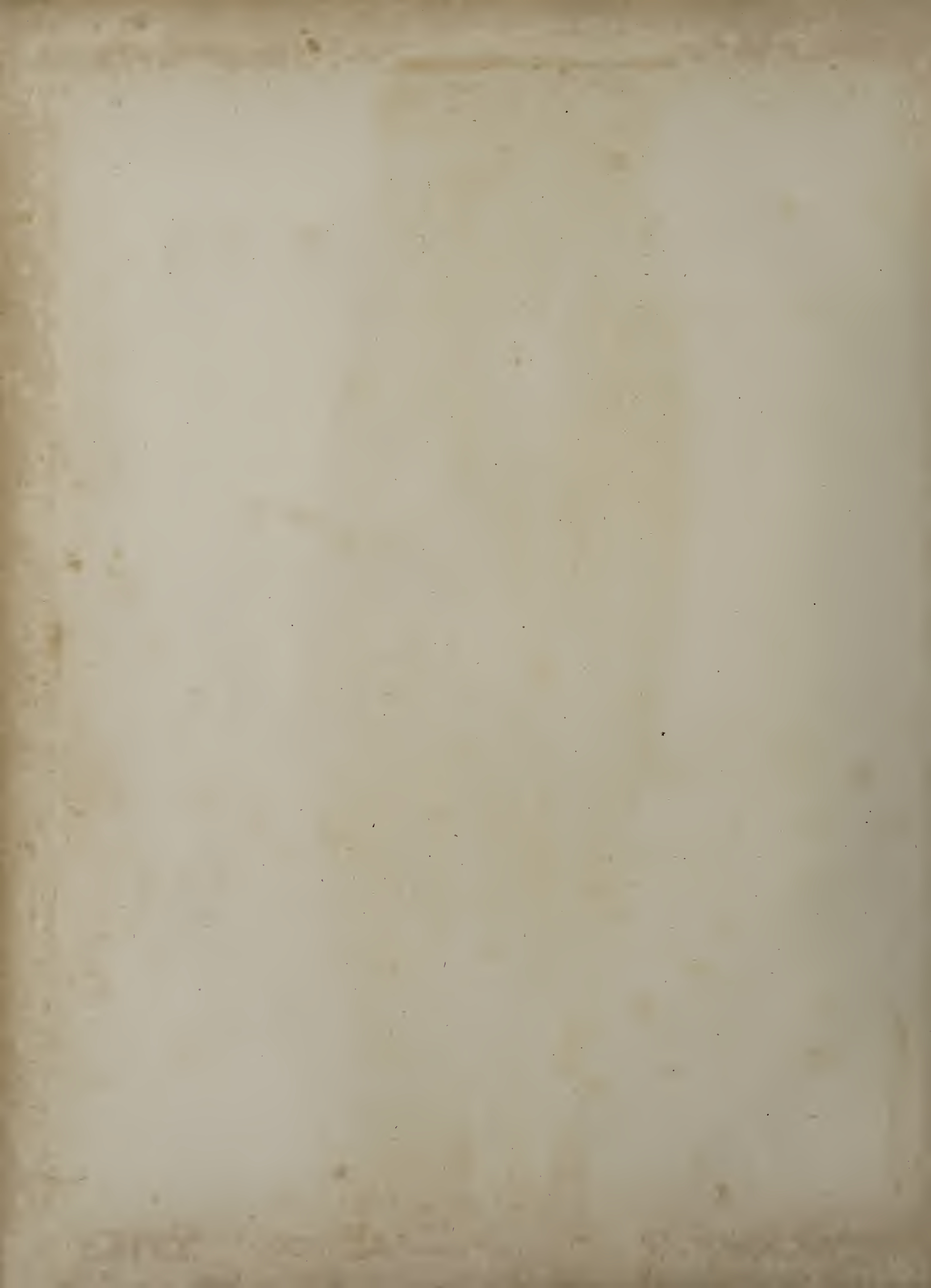
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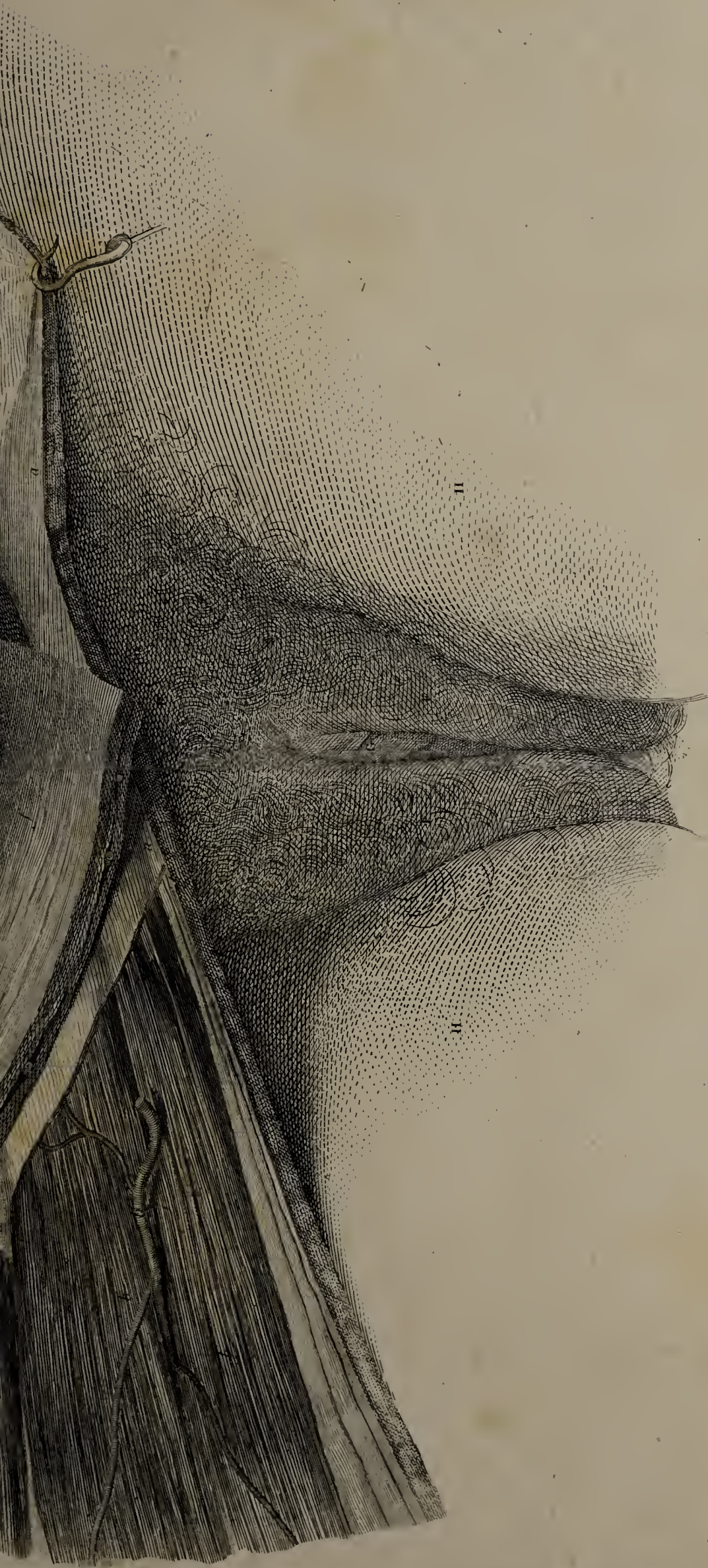
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PL. XL.

FŒTUS IN THE SIXTH MONTH.





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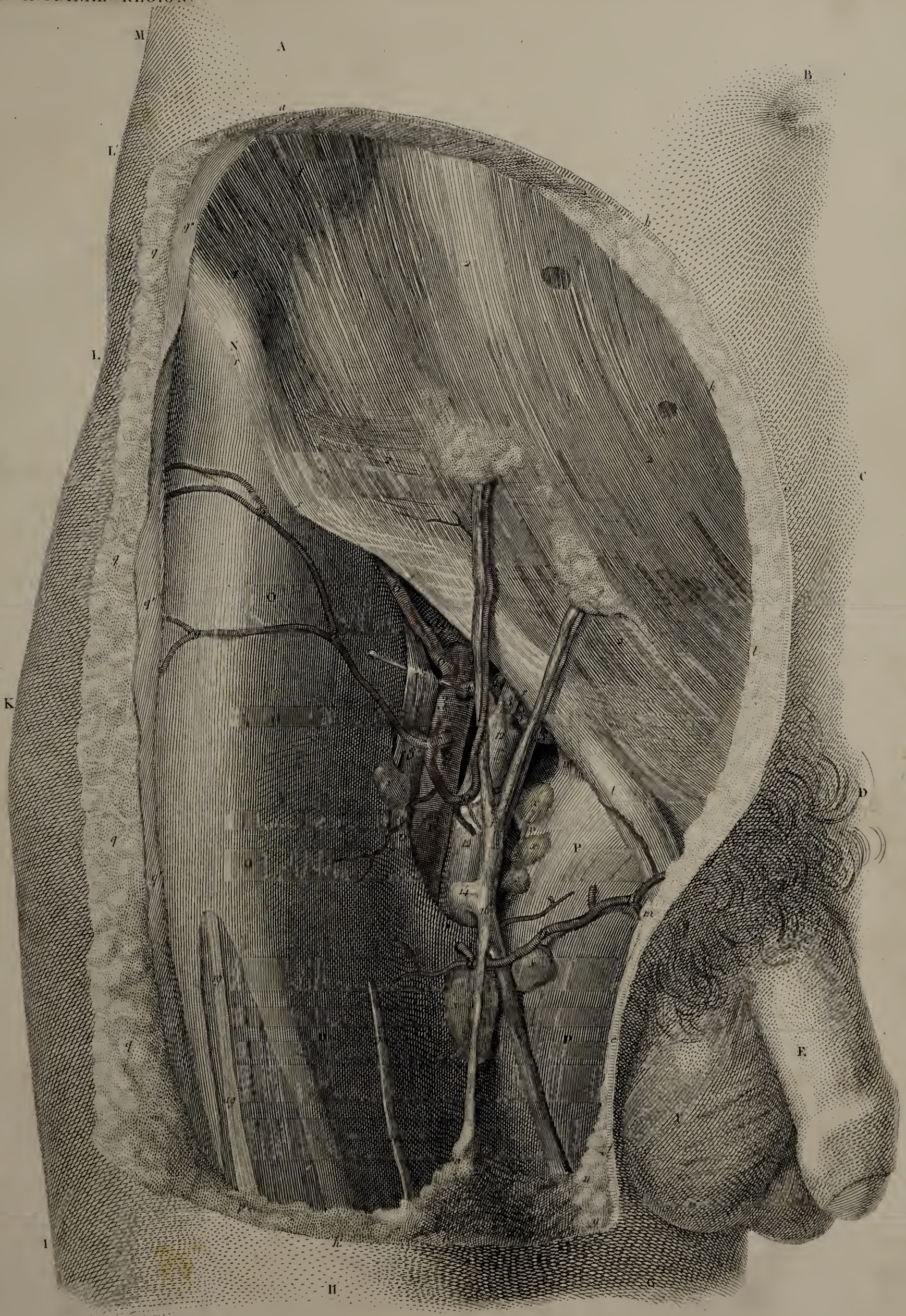


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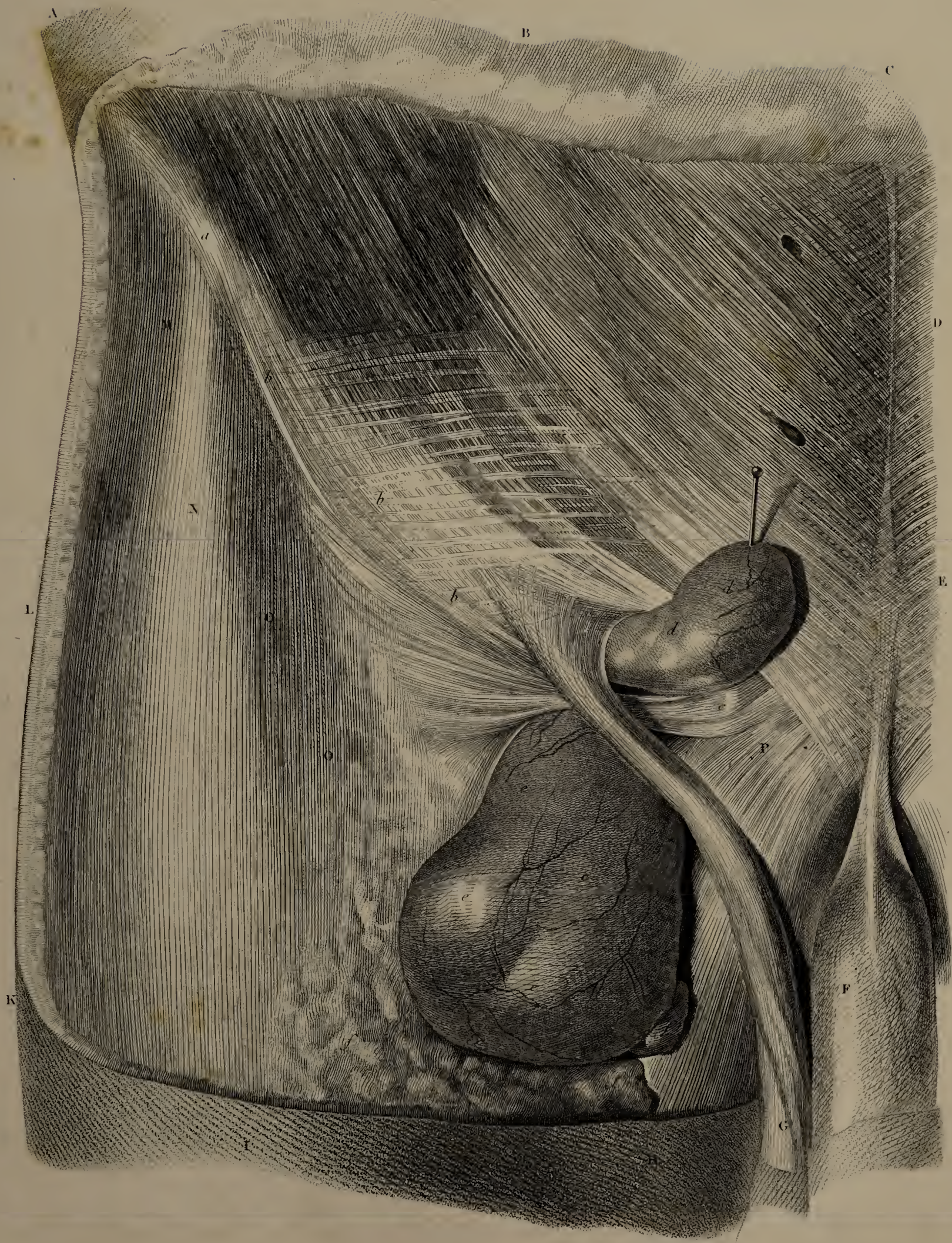
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Figure 1

Figure 2



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